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A SYSTEM OF

GENITO-URINARY DISEASES

SYPHILOLOGY AND DERMATOLOGY.

BY VARIOUS AUTHORS.

EDITED BY
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VOL. III.—PART II.

DERMATOLOGY.

WITH NUMEROUS ILLUSTRATIONS.

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CLASS V.—NEW GROWTHS.

CICATRIX. (Louis Heitzmann.)

Cicatrix or *scar* is the name given to a new formation of connective tissue covered by epidermis, which takes the place of a previous defect in the skin, replacing former normal tissue. A scar proper must be covered by epidermis, even though the latter may be very thin; as long as there is no epithelial covering, the new formation can not be called a scar.

Scars have a whitish or reddish, glistening, either smooth or uneven, contracted appearance, and are surrounded by normal skin, into which they blend. Recent scars are pigmented and reddish, older scars white. They may be either soft or indurated, traversed by ridges, knotted, movable with the skin, or firmly attached to the underlying tissues, and are divided into, first, *normal* or *flat scars*, those that are on a level with the surrounding skin; second, *atrophic scars*, depressed, situated below the level of the skin; and, third, *hypertrophic* or *hyperplastic scars*, elevated above the level of the skin.

Scars contain neither furrows, hair-follicles, sebaceous nor sweat glands, but are supplied on their surface with papillæ. The old view that papillæ are also absent is erroneous; for these are found in almost every scar, though as a general rule they are shallow and irregular. Even in cases where the surface appears smooth to the naked eye, shallow papillary formations are found to exist.

The formation of a scar can only take place after a previous destruction of the cutis, or at least of the papillary layer. Destruction of the epithelial layers only, such as takes place in eczema, impetigo, light variola, pemphigus, ecthyma, etc., will never leave scars. After a destruction of the papillary body only, shallow scars will form, which in the course of years may almost completely disappear—so much so, that neither the naked eye nor the microscope can demonstrate the former scar.

The first process in the formation of a scar will be the forming of granulation tissue, which in acute lesions appears rapidly after the opening of the abscess and the discharge of pus, in chronic processes, however, is slow and tedious. In both it is essentially similar.

Histologically granulation tissue has been divided into two layers: an upper, nonvascular, "pyogenous," containing pus, and a lower, vascular, so-called "plasmatic" layer. The upper surface is formed by a zone of pus. A number of isolated pus-corpuscles are seen situated in a finely granular substance, which latter is evidently the result of a disintegration of protoplasm. Gradually a zone is reached, which resembles medullary or embryonal tissue, and contains scanty, delicate connective-tissue bundles. In this zone the medullary corpuscles are not isolated but interconnected. We next come to a layer of myxomatous tissue with a well-pronounced basis substance, and a network formed of delicate fibrillæ between the groups of medullary elements situated in the myxomatous basis substance. By an increase of the connective-tissue bundles, the myxomatous becomes changed into a myxo-fibrous tissue. It is well known that granulation tissue mainly consists of newly formed myxomatous connective tissue, but the fact that toward the periphery of the granuloma a large amount of medullary tissue is present, the disintegration of which causes the appearance of pus on the surface, has been overlooked. Granulation tissue is freely supplied with capillary blood-vessels, in the neighborhood of which a certain amount of indifferent or embryonal tissue is always found. The number of newly formed blood-vessels varies; in a rapidly healing abscess they are numerous, whereas in a slow, ulcerative process they are scanty.

Gradually the myxomatous and myxo-fibrous granulation tissue becomes changed into a purely fibrous cicatricial tissue.

Scars, on being examined with moderately high powers of the microscope (Fig. 30), are found to consist of coarse connective-tissue bundles, interlacing in all directions. The difference between this structure and that of the normal cutis is found to consist in the great irregularity of the connective-tissue bundles. The interlacing of the connective-tissue, however, is not an essential property. In some scars, coarse bundles, infiltrated with a glue-yielding basis substance, are found alternating with bundles of delicate fibrous connective tissue, which latter are plainly made up of spindles with a large number of protoplasmic bodies. All coarse bundles are composed of a varying number of delicate, spindle-shaped ones. Capillary blood-vessels are found in the delicate connective tissue only. The vascularity of scars varies with their age; young scars contain a large number of blood-vessels, whereas old scars are only sparingly supplied with them. Upon this depends the difference in color between young and old scars, the former being livid red, the latter more or less whitish, in appearance.

In the papillary body, which, as the illustration shows, is present, though rather shallow and irregular, the connective-tissue tracts are thinner than in the remainder of the scar, and interlace, a feature never noticed in a normal papillary body. It contains no capillary loops. The epithelial layers do not differ from those of normal thin portions of skin.

The so-called cicatrices of pregnancy are not cicatrices proper, but are caused by the distention of the fibrous connective-tissue bundles of the cutis, with a consecutive flattening of the papillary layer.

Etiologically scars may be divided into *traumatic* and *pathological:* the former are the result of an injury, the latter of a disease. The differentiation, however, is not strictly logical, since the formation of a scar after traumatism greatly depends upon the complications which may result in the healing of the wound. Many scars, though they may be caused by a variety of lesions, are found to be very similar in character, and therefore can not be said to be indicative of the process by which they were produced. Nevertheless, they not infrequently possess certain features, such as number, size, outline, location, texture, etc., which point to the original disease.

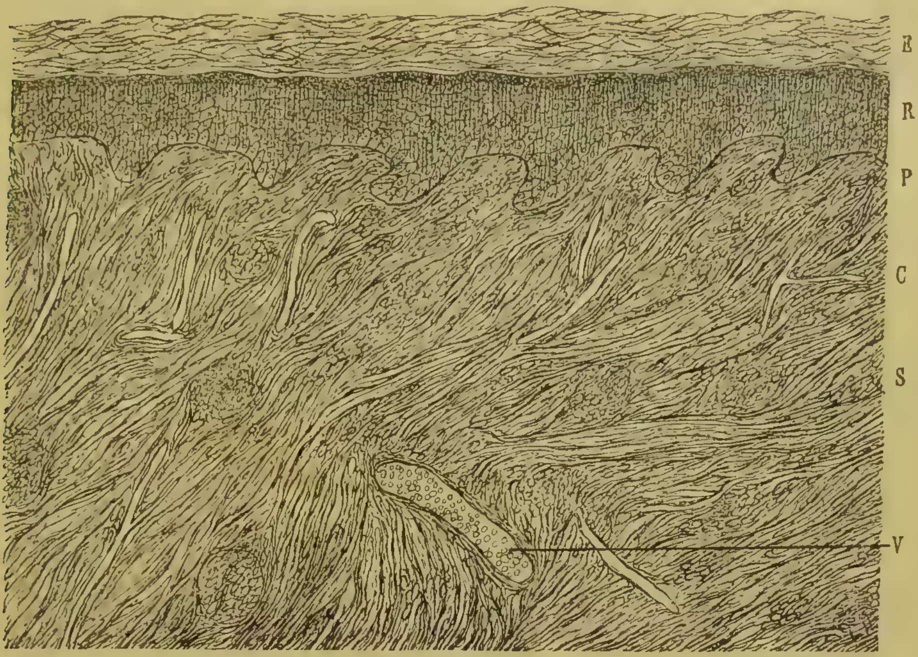


Fig. 30.—Burn-scar from neck of a girl. Magnified 100 diameters.

E, epidermis; R, rete mucosum; P, shallow and irregular papillary body; S, scar composed of coarse, irregularly interlacing bundles of fibrous connective tissue; C, scanty capillaries; V, vein.

Traumatic Scars.—In scars of a traumatic origin the nature of the traumatism can often be determined. The younger the scar the easier it is to determine its original cause. An incised wound, for instance, which has healed by first intention, leaves a fine, linear, movable scar, usually shorter than the wound. If the wound has suppurated any length of time, the scar is much broader, often adherent to the skin, and elevated. Scars after burns have an irregular form and usually an uneven, rough surface; they are freqently hypertrophic, indurated, and livid red, and have a marked tendency to contraction.

Pathological Scars.—Scars after pathological processes greatly vary in appearance, and will differ in accordance with the destructive lesion, which has been either an acute or a chronic one. If the skin has been destroyed by an acute suppurative process, the scar will be surrounded by healthy, normal skin; if by a chronic ulcer, the surrounding skin will always show traces of the previous new formation which has led to ulceration. The scar itself may be either flat, hypertrophic, or atrophic, according as to whether the destructive process has been superficial or deep. Scars after superficial lesions may disappear almost completely after years, leaving only a whitish line; after chronic lesions they will never fade.

Tubercular ulcerations leave extensive, irregular scars; scars after lupus are usually more superficial.

Syphilitic cicatrices are characterized by a peculiar reddish-brown pigmentation; their extent and depth greatly vary according to the extent and depth of the previous ulceration; they are often kidney or horseshoe shaped, have sharply limited margins and scalloped edges, are slightly depressed below the general level of the unaffected tissue, and frequently look as if made up of several parts—the result of the serpiginous form of many syphilitic ulcers.

Symptoms.—The symptoms resulting from cicatrices are, as a general rule, either very slight or none at all. Scars may be the seat of more or less pain from an entrapped nerve filament; occasionally the slightest touch, pressure of the clothing, or a cold draught, may cause pain. They may also cause disturbance of locomotion on account of the great degree of tension and in consequence of their contraction, distortion of the neighboring skin.

Treatment.—In the treatment which should commence with the formation of granulation tissue, the most important point is the obtaining of flat, thin, movable scars, by suitable surgical procedures. The scars after healing by first intention are, of course, the least disfiguring. In extensive destructions of the skin the method of transplantation, first introduced by Reverdin, Thiersch, and others, is to be resorted to. Local treatment, such as frequent cauterization with nitrate of silver, sulphate of copper, or caustic potash, may become necessary. Very often surgical procedures are the only means for the obtaining of normal scars. Small superficial scars of the face, such as result from variola, pustular acne, etc., may often be greatly improved by the long-continued internal use of small, frequently repeated doses of some oil, such as purified castor or cotton-seed oil, given in from three to twelve drop doses, three times daily.

KELOID. (LOUIS HEITZMANN.)

Keloid or *cheloid*, so called by Alibert in 1806, is the name given to a circumscribed, connective-tissue new growth of the skin, which often resembles an hypertrophied scar. Alibert has therefore divided this new growth into two kinds: *false* or *cicatricial keloid—kelis spuria*, which is simply a hypertrophied scar; and *true*, *spontaneous keloid—kelis genuina s. vera*, which develops without any injury to the skin. The term cicatricial keloid is often given not only to a hypertrophied scar or a scarlike growth, but to all tumors growing on the site of a previous cicatrix.

The disease is characterized by the appearance in the skin of one or more irregular, larger or smaller nodules or plaques, often containing radiating striæ, and resembling a cicatrix. It is elevated, its surface is smooth, its color whitish-pink or reddish, and it is of firm and elastic consistency. It is closely attached to the cutis, being movable only with it.

The size and shape of keloid greatly vary. False keloid usually has the size and shape of the scar from which it started, although it is possible that only one portion of the scar forms a keloid. True or spontaneous keloid is most frequently seen on the skin over the sternum, although it may appear on other parts of the body, such as the extremities, face, ears, and neck. It may be single or multiple, and as a general rule commences as a small nodule, the size of a pea or a bean, gradually increasing in size for a number of years and then remaining stationary, often for life. There may be twenty or even more tumors present; and Schwimmer has described the case of a woman where no less than one hundred and five tumors could be counted. The form is irregular; there may be a circumscribed elevated growth, which terminates abruptly toward the surrounding skin, or the tumor may be made up of a central portion with two or more prolongations extending into the healthy skin; it may be oval, cylindrical, roundish, or crab-shaped, sometimes appearing in the form of streaks or bands.

Etiology.—The *etiology* of keloid is as yet unknown. It occurs in both sexes, and almost at any age, although it is most frequent between the ages of thirty and fifty years. It seems that certain families and races, as for instance the negro and Oriental races, have a predisposition for the disease, and in these any slight injury or irritation may be the exciting cause. Piercing of the ears for earrings, extirpation of warts, leech-bites, acne pustules, cauterization, or any slight surgical operation may bring on the disease. It is a comparatively very rare affection, multiple keloid occurring even less frequently than the single tumor.

Anatomy.—The structure of keloid is similar to that of cicatrix, consisting of a dense fibrous connective-tissue growth, which has its seat in the cutis (Fig. 31). Warren, who first accurately described its structure, has shown that the disease has its starting point in the walls of the vessels. Kaposi divides keloid into three varieties: First, true keloid; second, the hypertrophic scar; and, third, cicatricial keloid. In true keloid, he says, the horny and mucous layers of the epidermis, together with the papillæ, are normal. The whole cutis is occupied by a new formation of dense fibrous connective tissue, the fibers being arranged more or less parallel to the surface of the growth, though here and there they run vertically. Nuclei and spindle-shaped nucleated bodies are found to be scanty in the body of the keloid, more abundant along the course of the blood-vessels, especially the arteries, where they may be seen in layers about the walls of the vessels. In the hypertrophic scar he was unable to find a single papilla, these being destroyed by the original disease which caused the cicatrix; the connective-tissue bundles also are less dense and more irregular. In the cicatricial keloid both forms are combined.

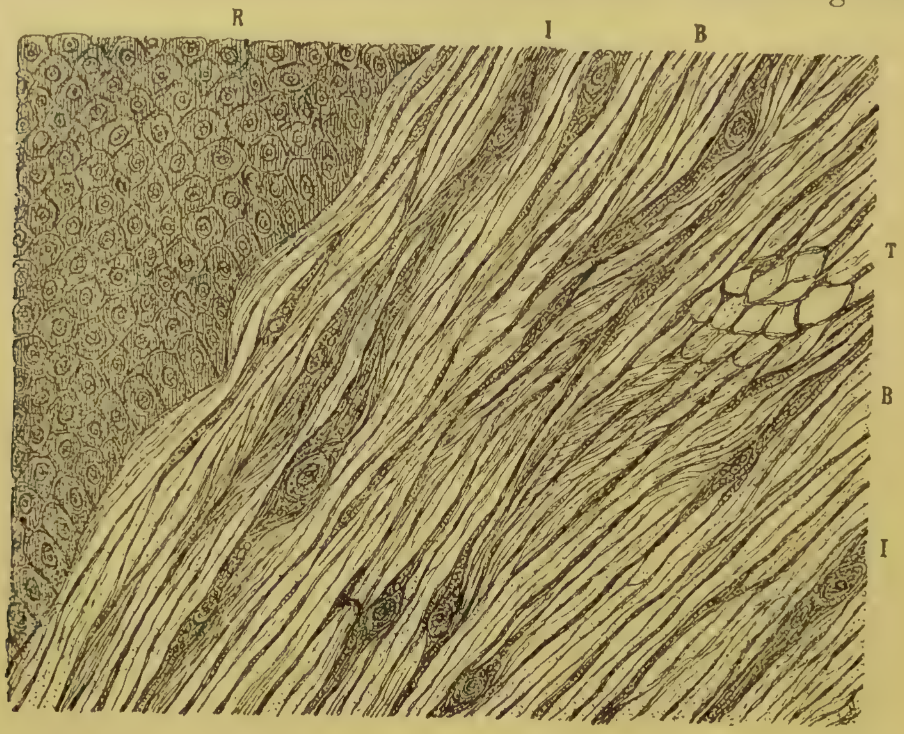


Fig. 31.—Keloid from chest of a woman. Magnified 500 diameters.

R, rete mucosum; B. B, coarse bundles of fibrous connective tissue in longitudinal section; T, coarse bundles in transverse section; I, I, interstices between the bundles, filled with protoplasm and delicate fibers.

This differentiation is, however, in reality not well pronounced, since shallow papillæ are often present in so-called false keloid. In the case from which Fig. 31 is drawn, and which, clinically, was a typical false keloid, being taken from the skin of the breast of a girl who had used an abundance of green soap on account of scabies, the result being hypertrophied scars, papillæ were well marked, though irregular. Coarse connective-tissue bundles are seen, which run to very near the epithelial layer, between two papillæ. Between the connective tissue and the epithelia there is a light interspace, no broader than the interspaces of basis substance between the single epithelia. The lowest epithelia—those nearest the derma—have a diffuse brown pigment, and the columnar epithelia are made up of irregular protoplasmic bodies, while the cuboidal epithelia of the rete mucosum do not differ from those found in the normal skin.

Another instance, showing that Kaposi's three varieties can not always be differentiated under the microscope, is described by Babesiu, who, in a case of multiple true keloid was unable to discover any papillæ.

Diagnosis.—The symptoms of keloid are so striking in character, that the diagnosis can be readily made in almost every instance. It might occasionally be confounded with simple cicatrix, from which, however, it can be differentiated by its color, outline, elevation, and consistence, and frequently by the presence of more or less pain. From sclero derma it can be readily distinguished, but when situated on the lip it may be difficult to differentiate it from rhino-scleroma, though this affection is extremely rare in America. It has nothing in common with so-called *Addison's keloid* which is now known as morphœa.

Prognosis.—The prognosis of the disease is not favorable, since spontaneous involution occurs only in the most rare instances. It does not of itself interfere with the general condition of the patient, and after a time ceases to grow.

Treatment.—As regards treatment we are almost helpless. It is pretty certain to reappear after excision, even though the incisions be carried far into the healthy skin. Hardaway has applied electrolysis in one case with good results. Vidal has successfully used multiple linear scarifications. Caustic remedies, as a rule, give unfavorable results. With the view of promoting absorption, iodine, either in the form of the tincture or in ointment, iodated glycerin, mercurial and lead plasters or spirits of green soap, may be tried, which may possibly be successful as long as the connective tissue is still young. Treatment with strong salicylic-acid plaster, ten to twenty or even twenty-five per cent, has been successful in a few cases, especially when the growths are small.

For the alleviation of the pain, which at times is very severe, hypodermic injections of morphine or cocaine are indicated. Chloroform or anodyne ointments, such as belladonna or stramonium, may also be effective. Internally, quinine, arsenic, strychnine, or iodide of potash, may be tried, but will hardly be followed by any favorable results.

FIBROMA. (LOUIS HEITZMANN.)

Fibromata or *fibroids* of the skin are connective-tissue new growths of a benign character, which may be divided into two distinct forms, according to the character of the connective tissue: First, *hard fibroma*, or *fibroma proper;* and, second, *soft fibroma*, or *molluscum fibrosum*. The former occurs more frequently as a single tumor, the latter is usually multiple. These tumors are developed partly from the deeper layers of the cutis, partly from the subcutaneous connective tissue.

Hard Fibromata, also called *desmoids*, usually occur singly on the trunk, extremities, or face, are sharply limited, movable, and covered by normal skin. They are round or oval, compact, smooth nodules, usually of small size, not larger than a hemp seed or a pea, though occasionally much larger tumors are met with. They may occur at any age, even in children, being sometimes present at birth. They grow very slowly, and may persist all through life.

Their cause is not known, though they may sometimes be directly traceable to the influence of a trauma, as, for example, the pricking of the ears, or repeated mechanical injuries, such as pressure or blows. With the exception of more or less pain, which at times is present, they give no further symptoms, and it is probable that these painful tumors are not pure fibromata, but neuro-fibromata.

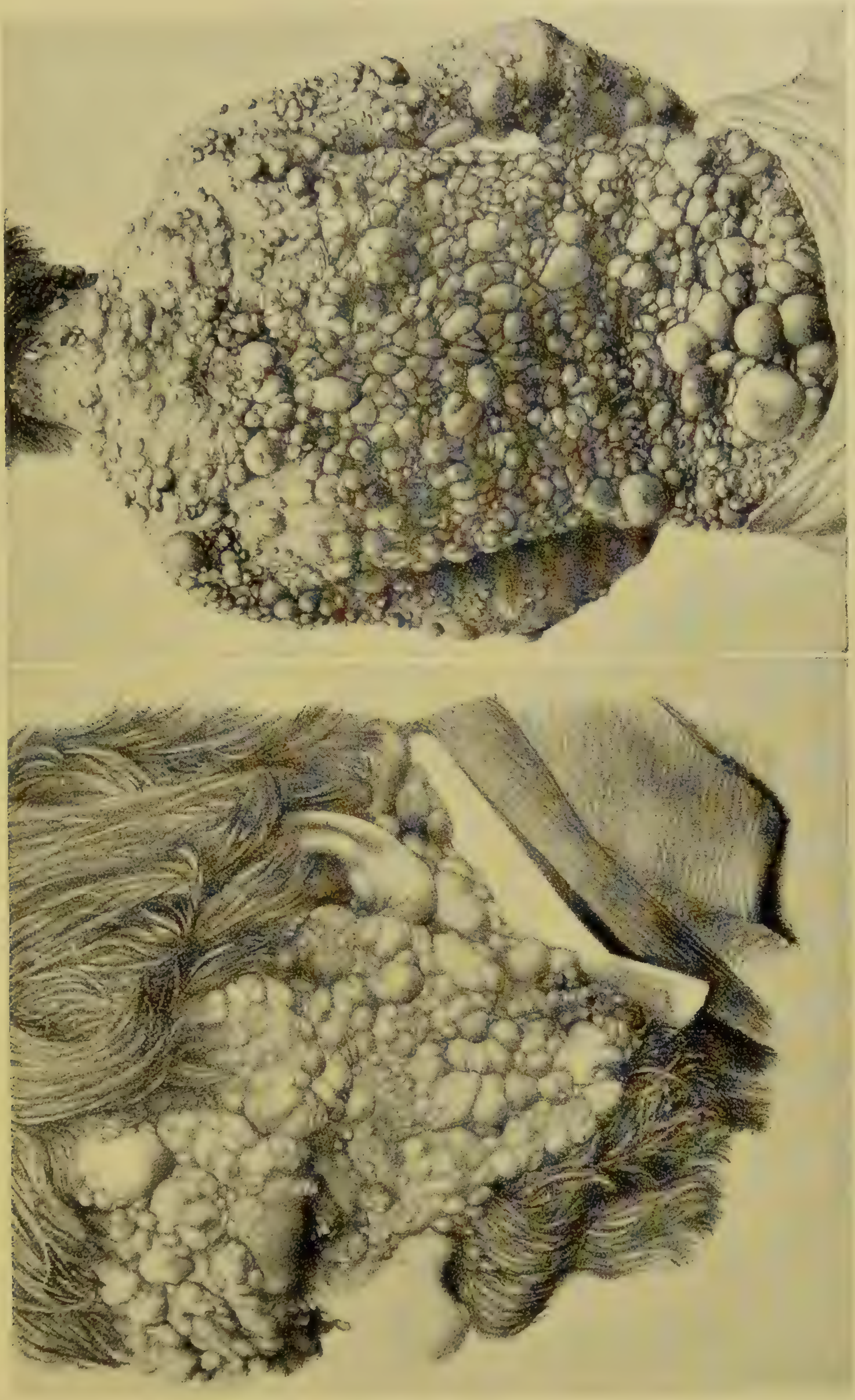
Microscopically these tumors are composed of bundles of dense interlacing fibrous connective tissue, made up of delicate spindles closely packed together. Between the spindles we find granular connective-tissue corpuscles, mostly of small size, similar to nuclei. The bundles interlace in all directions. The number of blood-vessels is, as a general rule, not very large.

Prognosis.—The prognosis of hard fibromata is favorable, since they often cease to develop after a certain time, occasionally becoming calcified or partly transformed into bone. Very rarely these tumors can become soft, sarcomatous, and thus malignant.

The Diagnosis of such tumors is easy; their slow growth, sharp limitation, and consistency are characteristic.

Soft Fibroma, or **Molluscum Fibrosum**—also called *fibroma molluscum*, *molluscum simplex*, *molluscum pendulum*, or *molluscum non-contagiosum*—is characterized by sessile or pedunculated, soft or more firm, round tumors, distinctly circumscribed and usually covered by normal skin. They vary in size from that of a pin's head or a split pea to a walnut or an egg, or they may be larger, forming tumors the size of a fist or a child's head or more, weighing sometimes as much as forty pounds. The smaller tumors are situated beneath the skin, where they can be dis-

PLATE XV.



Fibroma Molluscum (after Hutchinson).

tinguished as small nodules, often slightly projecting; when they grow larger they become sessile or pedunculated, or are pendulous growths hanging down from the part to which they are attached so as to resemble a sausage, a pear, or a nipple. The integument covering the smaller tumors is pale, that covering the larger bluish red, often tightly stretched, traversed by many blood-vessels, sometimes hypertrophied hair-follicles, dilated sebaceous glands and comedones; occasionally the skin becomes inflamed and ulcerated. The impression conveyed to the touch varies; the tumors may feel soft, as if the sacs were empty, or more elastic, firm, or lobulated.

The number of these growths differs greatly; at times they are single, more often, however, multiple, there being a hundred or more in various stages of development; in one case described by Octerlony no fewer than 2,033 small tumors could be counted. They may occur on any part of the body, especially the eyelids, face, head, trunk, genitals, and extremities. These fibromata are generally present at birth or become developed during childhood; occasionally they are first noticed about the time of puberty, or even later in life. They grow very slowly, but traumata or mechanical injuries cause them to develop more rapidly. After they have attained a certain size they usually remain stationary.

Etiology.—Their cause is not yet known; that heredity plays an important *rôle* can not, however, be doubted, since a large number of cases are on record where the disease occurred in several successive generations or in different members of the same family. A low standard of mental and physical development has been noticed in many patients, and the disease has therefore been considered as an affection of the central nervous system, but without sufficient reason. It occurs with equal frequency in both sexes and in various races.

With the exception of the extreme discomfort, which the larger tumors cause on account of their great size and weight, the disease is usually accompanied by no other symptoms. At times pain may be present and quite severe, probably from the pressure on some nerves.

Pathology.—As regards their pathology, these tumors originate from the deeper layers of the cutis—a fact first pointed out many years ago by Rokitansky. Virchow, Kaposi, and Duhring still maintain that they arise from the connective-tissue framework around the fat-lobules; and Fagge and Howse place their origin in the connective-tissue walls of the hair-sacs. As they grow out they lift up the skin, and finally project as simple or lobulated, pendant tumors. They are adherent to the skin only at their base, and may thus be easily enucleated. On cutting through one of the tumors, it is found to be composed of a white fibrous mass, inclosed in a dense connective-tissue capsule. The central portion is soft and pulpy, and upon pressure a small quantity of a yellowish fluid can be made to exude, whereas the peripheral portions are more firmly organized.

Under the microscope the structure of molluscum fibrosum (Fig. 32) is found to be that of a myxo-fibroma, being composed partly of myxomatous, partly of fibrous tissue, or a combination of both, thus greatly resembling elephantiasis mollis, which Virchow classifies as one of the forms of fibromåta. The myxomatous character is caused by the reticular arrangement of the usually delicate bundles of connective tissue, which at the same time inclose in their meshes a gelatinous, apparently homogeneous myxomatous basis substance, containing small nuclearlike bodies. The fibrous portion is made up of a number of fibrillæ, in the midst of which are delicate spindle-shaped bodies, and of dense bundles interlacing with loose and delicate ones. According to the investigations of Von Recklinghausen, the multiple fibromata of the skin are formed by a proliferation of the connective-tissue sheaths of the nerves—that is, from neuro-fibromata—which is followed by a connective-tissue proliferation of the sheaths of the blood-vessels, the sweat-glands, and the hair-follicles. According to Klebs, the nerve-fibers themselves become changed to fibrous bundles.

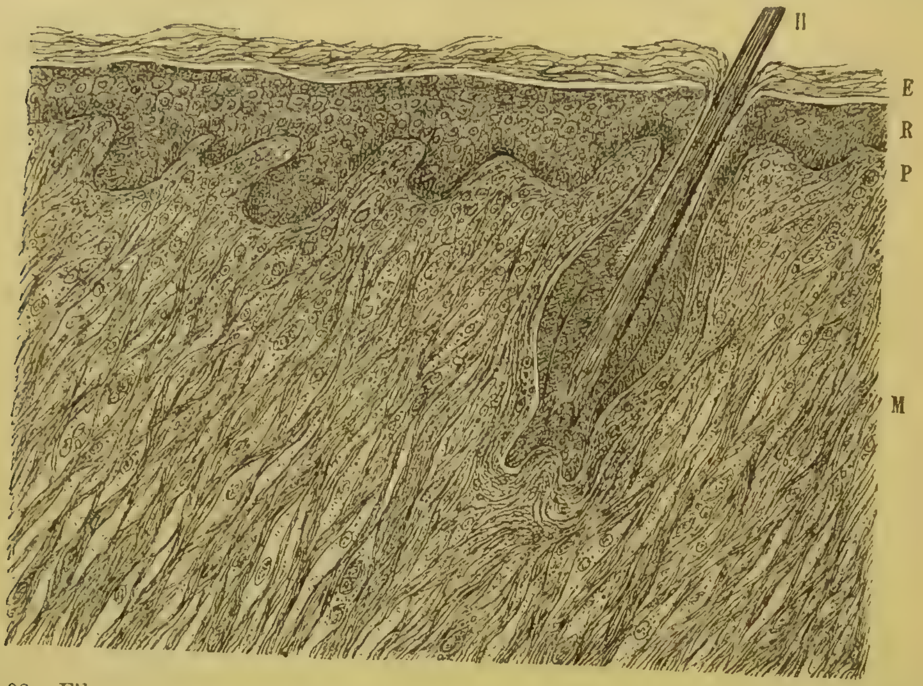


FIG. 32.—Fibroma molluscum or myxo-fibroma of skin of nose. Magnified 250 diameters. E, epidermis; R, rete mucosum; H, hair detached from papilla, ready to fall off; P, papillary body crowded with medullary corpuscles; M, myxo-fibrous tissue building up the tumor.

To this class of soft fibromata also belong bulky folded tumors of the skin, occurring principally in the face, especially around the nose and eyes, on the chest, and the posterior aspect of the body, and already known to Galenus as *leontiasis*. This affection is, as a rule, a combination of lipoma with fibroma.

Diagnosis.—The diagnosis of fibromata usually presents no difficulties. The slow growth, the sharp limitation, and the consistency are characteristic. From neuromata the tumors are differentiated, by the absence of pain, from lipomata by their more solid consistency and non-lobulated structure. From molluscum contagiosum or sebaceum they differ by their being situated deep in the skin, and their not standing forth as prominently as the latter; further, by the fact that they do not possess any depression or aperture at the apex. From papillomata they are distinguished by their smooth surface; from multiple sarcomata by their slow growth, and by the reddish color and great tendency to ulceration of the latter. With syphilitic gummata, leprosy, and tuberculosis they can hardly be confounded, being sufficiently differentiated by the absence of all constitutional symptoms.

Prognosis.—The prognosis is favorable as regards life, unfavorable as regards cure, since the tumors usually persist in spite of all treatment. Occasionally, though rarely, spontaneous involution takes place.

Treatment.—The treatment is purely surgical; the tumors, if not too numerous, may be excised, ligatured, or treated with the galvano-cautery, though recurrence frequently takes place. Single tumors may be enucleated. No other treatment will be attended with any success.

XANTHOMA. (LOUIS HEITZMANN.)

Xanthoma, or *xanthelasma*, of Erasmus Wilson, formerly called *vitiligoidea* by Addison and Gull, and *fibroma lipomatodes* by Virchow, is characterized by the appearance of small yellowish or yellowish-white, usually circumscribed macules, papules, or tubercles, occurring singly or in groups, which may be found on almost any portion of the skin, but are most common on the eyelids.

The disease was first described by Rayer in 1836, under the name of *plaques jaunâtres*, later by Bazin, who gave it the name *molluscum cholesterique*. In 1851, Addison and Gull studied the pathology of the disease more closely, and called it *vitiligoidea plana* and *tuberosa*. Erasmus Wilson at first believed it to be an affection of the sebaceous glands, and gave it the name *molluscum sebaceum* in 1863; later on he modified his views, considering it an affection of the epidermis, and calling it *xanthelasma*. In recent years the disease has been frequently studied, and a large number of cases have been described.

Xanthoma most frequently occurs in two distinct forms, viz., *xanthoma planum* and *xanthoma tuberculosum*, the latter being, in all probability, developed from the former. To these, two other forms, which simply represent a more advanced stage of the disease, must be added, *xanthoma tuberosum* and *xanthoma mollusciforme*, the latter described by Köbner. Besnier mentions a form which he calls *xanthome en tumeurs.*

Xanthoma Planum.—The most common type of the disease is *xanthoma planum.* It is most frequently found on the eyelids, and in this situation is by no means rare, being often present for years without attracting attention. It consists of variously sized macules or plaques, from the size of a pin's head to that of a bean, finger-nail, or even larger, having a straw-colored, yellowish, creamy, or even whitish tint, and a roundish, oval, or elongated shape. These plaques are either flat or have slightly elevated borders, and are covered by normal skin. They are smooth and even to the touch, distinctly circumscribed, and do not give the impression of any foreign substance existing in the skin when taken up between the fingers. With the exception of a slight itching or an occasional burning, they produce no subjective sensations. They are most commonly situated near the inner canthus of one or all of the eyelids, and are often grouped symmetrically ; occasionally they are found on the cheeks, nose, ears, neck, and other portions of the skin, as also on the mucous membranes of the mouth, the palate, gums, the tongue, pharynx, trachea, larynx, bronchi, and the digestive tract. Larger and smaller growths may lie side by side and may coalesce. They usually commence as very small formations, gradually growing larger in the course of years, but seldom give rise to any inconvenience.

Xanthoma Tuberculosum.—*The tubercular form of the disease* differs from the flat variety, with which it may coexist only in its greater development. It occurs in pinhead, pea, bean, or larger sized, somewhat elevated patches or tubercles, whitish or yellowish in color, and either isolated or in groups of various sizes, *xanthoma multiplex*, sometimes forming striated plaques. Their consistency is somewhat greater than that of the surrounding skin. Although this form also may occur on the eyelids, it is only rarely met with in this locality, but more frequently on the cheeks, the scalp, neck, body, and extremities, especially the elbows, knees, fingers, and toes, the palms and soles, and on the genital organs. This variety may also occur on the mucous membranes, such as those of the mouth, the respiratory and the gastro-intestinal tracts, the liver, the spleen, the lining of the bile-ducts, and has been described as involving the peritoneum, the pericardium, the endocardium, and the inner coat of the larger arteries; also on the sheaths of the tendons.

Xanthoma tuberosum and *xanthoma mollusciforme* are comparatively rare, both are exaggerated stages of the disease, the growths often assuming the size of a walnut or a hen's egg, or they may be even larger. The term *xanthoma tuberosum* is frequently employed when the tubercular variety of the disease is meant, but should be restricted to the very large growths. Large pedunculated tumors have been described as *xanthoma molluseiforme pendulum.*

Up to about twelve years ago xanthoma was considered a rare disease. In recent years the literature on this subject has become large, and the disease has been found to be quite common. Xanthoma palpebrarum is especially so. The number of the xanthomatous growths may be very large, and they may be scattered irregularly over the whole surface of the body, or be symmetrically arranged over a smaller area. The plane and tubercular varieties frequently occur together in the same patient, the former on the eyelids, the latter on the trunk and extremities. Often a patch of xanthoma planum is seen, which has become tuberculous at the margin.

Etiology.—The cause of the disease is as yet unknown. In a certain percentage of all cases jaundice was noticed either just previous to the development of the disease or associated with it, and it was formerly attributed to an affection of the liver. By some it was considered to be due to the circulation of bile-pigment in the blood. In about fifty per cent of the cases, however, no affection of the liver was present, and the anatomy of the disease has conclusively shown that there is no relation whatever between the two. In a small number of cases heredity was found to play an important part in its development, two or more cases occurring in the same family.

The disease is most common in middle or more advanced life, though quite a number of cases have been reported in small children—one case as early as the sixth month. The female sex is more frequently affected than the male, in the proportion of three to one.

Anatomy.—As to its anatomy, xanthoma has been frequently examined. It is a connective-tissue new growth, containing an abundance of fat (Fig. 33). The former view, entertained by Hebra, Geber, and others, that it is due to a hypertrophy of the sebaceous glands, is incorrect. These authors believed the disease to be similar to milium, there being two forms, which could be distinctly differentiated from each other, the one of a connective-tissue nature being called fibroma lipomatodes, the other developed from a degeneration of the glands—vitiligoidea.

Elaborate studies on this subject have been made by Touton in 1885, and Knauss in 1888, which I could corroborate in all essential points. If we examine a specimen of xanthoma with moderately high powers of the microscope, we find that it is made up of newly formed connective-tissue corpuscles and endothelia, containing an abundance of fat-granules. Between the connective-tissue fibers a large number of variously sized embryonal or medullary bodies, the so-called "xanthoma cells," are found. These are the characteristic elements of xanthoma, and greatly vary in size, some being very small, others extremely large. The bodies under consideration have a more or less well-pronounced outline and coarsely granular protoplasm, with one or more round or oval nuclei of considerable size, these characteristics being obscured by the great number of fat-globules.

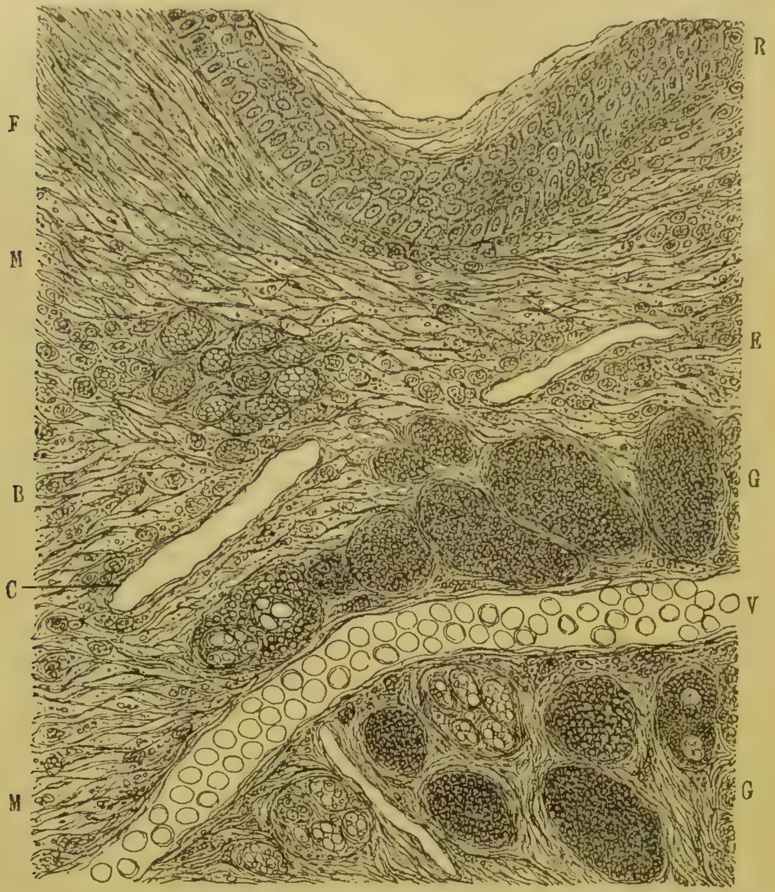


Fig. 33.—Xanthoma of upper eyelid. Vertical section. Magnified 500 diameters.

R, rete mucosum; F, fibrous portion of derma; M, M, myxomatous portion of derma; E, embryonal or medullary corpuscles, crowded mainly around the blood-vessels; B, embryonal corpuscles, in beginning fatty change; G, G, groups of embryonal or xanthoma corpuscles; C, capillary blood-vessel, crowded with fat-globules; V, vein.

The smallest xanthoma corpuscles are spindle-shaped, the largest oval or globular. They are found throughout the cutis up as far as the rete mucosum, grouped together in smaller or larger lobular masses, though a small zone near the rete is usually free. The blood-vessels are large and numerous, many being surrounded by xanthoma corpuscles. The epidermis is somewhat thinner, the papillary layer either entirely absent or shallow and irregular. The hair-follicles and sebaceous glands are unchanged, though rather scanty; the sweat-glands are also frequently surrounded by the xanthoma corpuscles. The subcutaneous tissue is usually unchanged, though a few of these corpuscles may here and there be seen. Besides the characteristic xanthoma elements, other medullary bodies are found, especially in the upper layers of the cutis, which represent a transition stage between the connective-tissue corpuscles and endothelia and the xanthoma corpuscles. An increase in pigmentation is sometimes present in the lower layers of the epidermis, at other times such an increase can not be seen. The color of the xanthoma is undoubtedly due to the fat-globules.

Diagnosis.—The diagnosis of xanthoma is easy. The chief disease with which it might be confounded is milium, which, if there is an aggregation of milium papules, may resemble xanthoma. The diagnosis, however, becomes at once apparent on breaking open the epidermis over one of the papules, when the characteristic milium contents can be squeezed out. This is never the case with xanthoma, since in this disease nothing but a little blood and serum can be obtained. In children it must be differentiated from pigmentless white moles by their color and softness, and by the latter always being congenital.

Prognosis.—The prognosis of the disease is favorable. As a general rule it develops slowly and gradually, often lasting during life but causing no inconvenience. A few cases are on record in which it had developed within a few weeks, but these are very rare. It has been known to undergo spontaneous resolution.

Treatment.—The treatment is mostly a surgical one. In the flat variety, especially when it occurs on the eyelids, simple excision with curved scissors will always be successful. When the operation is performed carefully, the growths will not return. The curette may be used, as also caustics. In severe cases of xanthoma the surgical treatment is of course out of the question, and other remedies should be resorted to. The best seems to be the one recently reported by Morrow. It consists in the application of a twenty-per-cent salicylic-acid plaster, to be worn for several days; when the epidermis is thoroughly disintegrated the plaster is removed, carrying the latter and also a number of the xanthoma tubercles with it; others are so softened and separated from their attachments that they can be readily lifted or dug out with a falciform curved curette. This treatment had already been employed by the writer in two cases some years ago, and in both with gratifying results; in the one a fifteen-per-cent plaster with emplastrum diachylon simplex and emplastrum saponatum, equal parts, used for several weeks, was sufficient to remove many of the growths; in the other a twenty or twenty-five-per-cent plaster was applied. Although this method will undoubtedly not be successful in every case, it should always be tried on account of its simplicity. Stern has reported a cure after the application of a ten-per-cent sublimate collodium.

Xanthoma Diabeticorum.—In 1883 Malcolm Morris called attention to the fact that a disease resembling xanthoma but somewhat different from it both clinically and pathologically was occasionally present in persons suffering with diabetes. Before him a number of cases of xanthoma with diabetes had been reported, but he was the first to note certain differences between the two diseases. Since then quite a number of cases of xanthoma diabeticorum have been reported, and it has been regarded as a distinct disease, somewhat resembling simple xanthoma and of a lichenoid character.

According to Crocker, this disease consists of dull red, discrete, or confluent papules, quite firm to the touch, well defined at the margin, and roundish or obtusely conical. On the top of many of them, but not of all, is a yellow or yellowish-white head, which looks like a pustule, but is really solid, and some of the papules are dotted or streaked with red from dilated blood-vessels. Itching, pricking, or tenderness is generally felt in the lesions and in one case shooting pains preceded the eruption. The most common positions are the elbows and knees, where they are generally confluent, though the papular origin is still discernible. They also occur on the buttocks and extensor surfaces generally, on the mucous membrane of the mouth, on the face, the scalp, and bend of the ankles. The disease seems to affect males much more frequently than females, and usually follows the diabetes, although it may precede it.

The eruption comes out suddenly at first, usually upon the extensor aspect of the limbs, especially the forearms, and then more gradually on the other parts ; after remaining stationary for some months or years, the papules begin to disappear, rather quickly when they once begin to go, leaving no trace behind them ; or while some disappear others may come out. As a general rule the eyelids remain free, but this is not invariably the case.

Pathology.—The pathology of the affection differs from that of simple xanthoma only in degree, being less pronounced. The epidermis is normal, the papillæ in some parts enlarged, in others partly obliterated. The chief change is in the middle and lower parts of the corium ; the characteristic xanthoma corpuscles are present in the connective tissue, and usually most pronounced around the dilated blood-vessels, the hair-follicles, and the sebaceous glands. Fat-globules are either not present at all or in a small degree only.

Diagnosis.—Xanthoma diabeticorum is said to differ from simple xanthoma in the following particulars: 1. Its sudden involution and evolution, which latter almost invariably occurs sooner or later, while in simple xanthoma it is exceptional and gradual. 2. The lesions are firm and solid instead of soft, which is always the case at the commencement of xanthoma. 3. They are inflammatory and of a lichenoid character; the yellow top is not present at first, nor in all the papules; in simple xanthoma the signs of inflammation are absent. 4. There are never any patches or striæ, but only tubercles. 5. The tumors are usually though not invariably absent on the eyelids, the opposite of that found in simple xanthoma. 6. The lesions are frequently present in the mouth. 7. Subjective symptoms are the rule in xanthoma diabeticorum, the exception in simple xanthoma.

In spite of all these differences, this disease is in all probability only a variety of xanthoma and not a distinct affection. The differences may easily be accounted for—first by the acuteness of the attack, and second by the constitutional disturbances caused by the diabetes.

The **Prognosis** is good ; the lesions almost invariably disappear spontaneously after months or years.

The **Treatment** should be directed more to the cure of the diabetes than to that of the skin affection. Salicylic-acid plaster locally, may, however, be employed, and will certainly be found to be beneficial.

LIPOMA. (Louis Heitzmann.)

Lipoma, or *fatty tumor*, is a new growth composed of fat tissue, occurring either in the subcutaneous tissue or in the skin. It occurs in two forms, the diffuse and the circumscribed.

Diffuse Lipomata, producing flat, mostly lobulated elevations of the skin, being destitute of bordering lines toward the normal adjacent tissue, if richly supplied with fibrous connective tissue, especially when occurring in the face, are called *leontiasis*.

Circumscribed Lipomata are more common than diffuse. They occur as roundish or pear-shaped lobulated tumors of varying size, some being no larger than a hazelnut, others as large as a man's head or more, weighing many pounds, often indistinctly pedunculated. The skin covering the tumors is usually movable and of normal consistency, though it may be somewhat thickened and pigmented and raised in folds; after injuries from without, long-continued pressure or friction of the clothing, and over the largest tumors the skin becomes attached to the new growth. Under such circumstances even ulceration may be produced, but is extremely rare. The tumor itself is also usually movable. These new growths may be either single or multiple, in some cases the whole integument being studded with them.

Anatomy.—Lipomata are composed of fat tissue (Fig. 34), exhibiting a lobular structure and traversed by a greater or less amount of connective tissue, which carries the blood-vessels. When the tumors are soft, the connective tissue is scanty and the fat of a more oily nature, while in fibrous lipomata, which were formerly called *steatomata*, the connective-tissue frame attains considerable development and the fat is more solid. The fat-globules resemble those of normal fat tissue, though they are usually of much larger size. The tumors may remain unchanged for a lifetime; not infrequently, however, calcareous deposition is found in the connective-tissue frame, and occasionally even ossification.

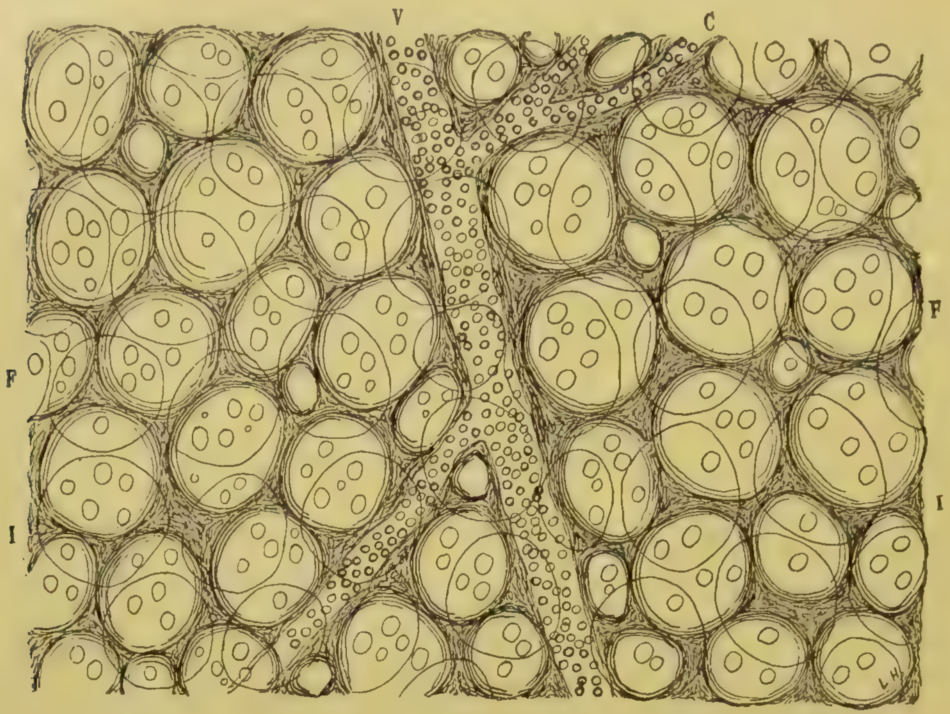


Fig. 34.—Lipoma of skin of shoulder. Magnified 200 diameters.

F, F, fat-globules, holding vacuoles, due to preservation in chromic acid solution; I, I, interstitial fibrous connective tissue; V, vein; C, capillary.

These growths may occur combined with myxoma, fibroma, or myxo-fibroma, producing tumors called *nævus lipomatodes;* also with cavernous angioma and with sarcoma and myxo-sarcoma.

Circumscribed lipomata are rarely congenital; they may develop at any time, but are most common in adult life. They are more frequently found in females than in males, the proportion being about two to one, and may occur on almost any part of the body, though more often on the neck and gluteal region. Diffuse lipomata occur almost invariably in males, usually between the thirty-fifth and forty-fifth year.

Fatty tumors, as a rule, develop very slowly in the course of many years, sometimes commencing as small growths in early life and becoming gradually larger, or remaining stationary for years. Occasionally they will grow in a comparatively short time. They usually present no subjective symptoms, being painful only when nerve branches are involved in their growth.

Diagnosis.—This presents no difficulties, and neither the circumscribed nor the diffuse form can well be mistaken for anything else. The painless, soft, lobular, movable tumor is characteristic. Multiple lipomata might, perhaps, at first be mistaken for sarcomata, but a more careful observation will soon clear up any error.

The **Prognosis** is good, since these growths are perfectly benign, though their occasional large size may be disagreeable.

The **Treatment** is purely surgical, but unless there are serious inconveniences they are best left alone. Excision is the only plan to resort to, and in the smaller tumors is comparatively easy. In diffuse lipomata, of course, only partial extirpation can be resorted to. When completely removed, recurrence does not take place. Parenchymatous injections of alcohol and massage have been tried, but with only partial success.

MYOMA. (Louis Heitzmann.)

Myomata or *leiomyomata* of the skin are tumors composed of smooth muscle-fibers, between which is a varying amount of delicate connective tissue (Fig. 35). They are extremely rare, and form small, roundish, or oval pinhead to cherry-sized, sometimes larger, elevated lesions, of a pale red color and rather hard consistency, situated in the cutis or subcutaneous tissue. They are either single or multiple, sometimes extremely painful, and either sessile or pedunculated. When they occur singly they are

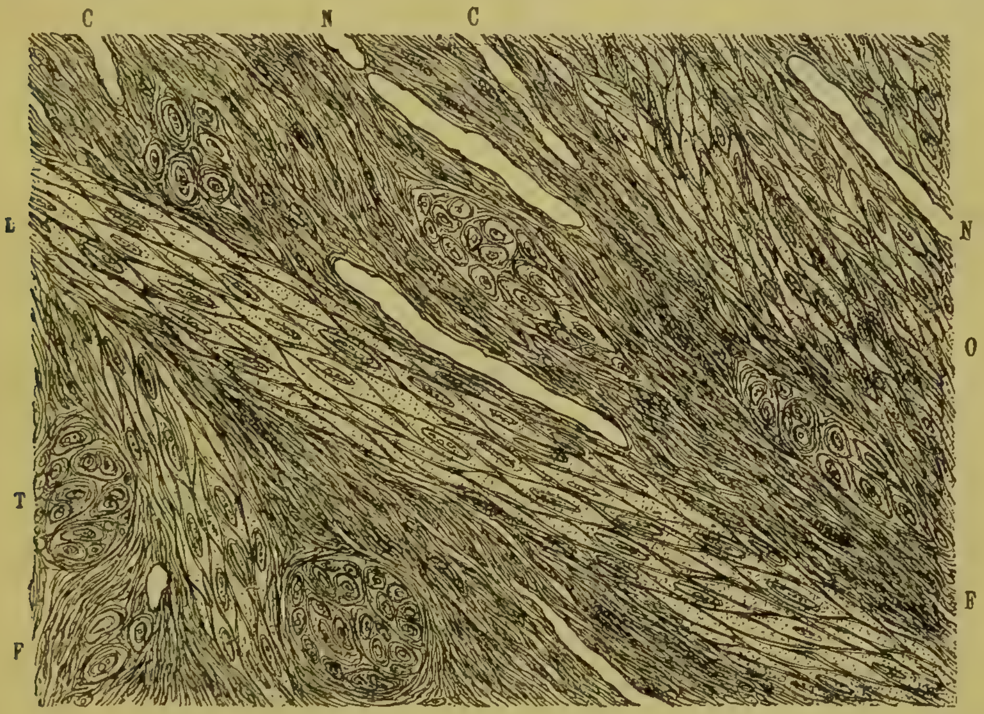


Fig. 35.—Neuro-myoma of skin of forearm. Magnified 500 diameters.

L, longitudinal bundles of smooth muscle-fibers; O, oblique bundles of smooth muscle-fibers; T, transverse bundles of smooth muscle-fibers; F, F, dense fibrous connective tissue; N, N, medullated nerve-fibers; C, C, capillary blood-vessels.

mostly found either on the scrotum, the labia majora, or around the nipples; when multiple they may be scattered all over the body, but are most common on the upper extremities and the trunk.

These tumors originate either from the muscle-fibers in the skin itself, such as the tunica dartos of the scrotum, the labia, or the mammæ, where they form rather large tumors, the *myome dartique* of Besnier; or from the musculi arrectores pilorum, where they are small, the *leiomyomata;* or they may arise from the muscle-fibers of the walls of the blood-vessels. They may be either pure muscle tumors, composed of a network of smooth, spindle-shaped muscle bundles, with scanty connective tissue and an abundance of elastic fibers, or associated with new formations of blood-vessels, the so-called *myoma teleangiectodes.* In other cases the fibrous connective tissue may be abundant, forming *myo-fibromata.*

Myomata may occur at any age, but are more frequent in advanced life; they seem to affect females more often than males. They are contractile, and grow very slowly; occasionally they even seem to become smaller for a time, or undergo spontaneous involution. Sometimes they give no symptoms, at other times they are either slightly sensitive or may be very painful.

The **Prognosis** is good, as the tumors are perfectly benign.

The **Diagnosis** may be difficult, and can then only be settled by a microscopical examination. Whenever there are small solitary or localized multiple tumors, growing very slowly, with no tendency toward ulceration, myomata must be thought of.

The **Treatment** of myomata consists in extirpation. Even this, however, is not always successful. In one case, reported by Jadassohn, some of the extremely painful tumors were removed, but the pain, which had temporarily disappeared, reappeared in the course of a few weeks, and was then almost as severe as at first. Neither narcotics nor the application of electricity had any effect in relieving the pain in this case. Ergotin, either subcutaneously or given internally, may be tried, and might perhaps reduce the size of the tumors. Arsenic, continued for a long time, has also been recommended.

NEUROMA. (Louis Heitzmann.)

Neuromata, or *nerve tumors*, are new growths characterized by the appearance of small pinhead to hazelnut-sized, rarely larger, elevated nodules, or tubercles, of a rather hard consistency, situated in the corium and subcutaneous tissue. They are rare, either single or multiple, and are usually very painful. Their color is pinkish or pale red, and they are partially movable with the covering skin.

Anatomically, tumors composed of nerves only—that is, neuromata proper—probably do not exist. All these growths are composed of medullated and non-medullated nerve-fibers, intermixed with a greater or less amount of delicate fibrous connective tissue, and should be called fibro-neuromata (Fig. 36). Virchow has divided neuromata into myelinic, those composed of medullated, and amyelinic, composed of non-medullated nerve-fibers. Except in the auditory nerve, it is, however, doubtful whether the latter variety really exists, as both the medullated and non-medullated nerve-fibers usually occur in the same growth.

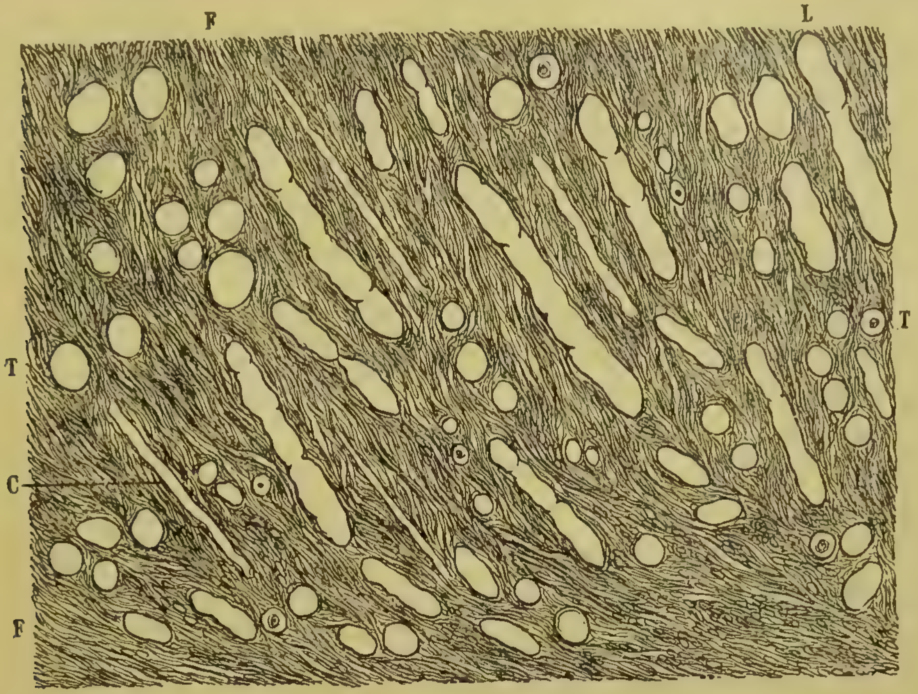


FIG. 36.—Fibro-neuroma of derma. Magnified 500 diameters.

L, longitudinal section of medullated nerve-fiber; T, T, transverse sections of medullated nerve-fibers, partly holding axis-cylinders; F, F, dense fibrous connective tissue, the outgrowth of the inner perineurium; C, capillary blood-vessel.

Etiology.—The cause of the disease is unknown. Sometimes the neuromata are present at birth or develop in early life, and with these there may be an affection of the central nervous system or of the peripheral nerves. Occasionally the tumors seem to be inherited, as two or more members of the same family have been known to suffer from the disease. The neuromata may, however, develop at any age, though they are most common between the ages of twenty and fifty years. According to Virchow, individuals suffering with tuberculosis are especially liable to contract the disease. Traumata and mechanical irritations have undoubtedly a great influence in the development of the affection.

Neuromata may occur on almost any portion of the body, but are most common on the upper and lower extremities and the buttocks.

There may be either a single tumor only or multiple disseminated growths, a hundred or more can be present, situated deeply in the skin or in the subcutaneous tissue.

Symptoms.—The chief symptom is more or less severe pain, although a few cases in which this symptom was absent have been reported. The disease develops slowly, and in the first months or years may be almost painless, then gradually slight pain of a pricking character develops, and this becomes more severe in the course of time. The pain is either continuous or paroxysmal, and in the latter case the slightest pressure or mere touch, exposure to cold air or excitement, may be sufficient to bring it on; it will then continue for one or many hours, disappear for a short time, only to reappear with the same intensity as before. It can be referred either directly to the tumor or radiate throughout the whole extremity. This severe pain is due to the pressure exerted by the connective-tissue growths upon the nerves. As tumors, having no apparent connection whatever with nerves, may also exist, pain can at times be entirely absent. It is still an open question whether the nerve-fibers in such cases are newly formed. If the internal nerve-sheath be increased, the innumerable nerve-fibers are pushed apart, and thus may give the impression of constituting a true neuroma.

The **Prognosis** of neuromata or fibro-neuromata is good. The disease develops very slowly in the course of many years, and is perfectly benign. Combinations with sarcoma do, however, occur, and in the latter instance the prognosis is bad.

The **Diagnosis** is not always easy, and a microscopical examination may become necessary before it can be made positively.

The **Treatment** is purely surgical, as excision is the only means we possess of curing the affection. In multiple tumors, removal of all the growths may be impossible, and in such a case only the most painful should be excised.

Mention may here be made of the so-called *tubercula dolorosa subcutanea*, which are small, deeply seated nodules, painful on pressure, occurring mostly on the lower extremities, though they are also seen in the face, the mammary gland, the scrotum, and near articulations. They are usually single, though occasionally multiple, and are freely movable under the skin. They are never present in children, and rarely at puberty, but usually in more advanced life, and are more common in females. They grow very slowly, and never return after extirpation.

ANGIOMA. (W. A. HARDAWAY.)

Definition.—The term *angioma* is applied to an affection characterized by an increase in number and size of the blood-vessels in a limited area of the skin.

It is difficult to divide the angiomata into classes for purposes of convenience of clinical description. Many schemes for such classification have been presented by various writers, with more or less claim to consideration. Kaposi divides the angiomata into (1) telangiectasis, (2) vascular nævus, (3) angio-elephantiasis (4) cavernous tumor.

It seems to the writer that in the interests of dermatological description this classification may be simplified. Thus, the cavernous tumor mentioned above has a structure similar to some of the vascular nævi, differing principally in being surrounded by a dense capsule; while angio-elephantiasis includes those congenital pachydermias which more probably belong to the affections of the lymph system. Great confusion has existed in regard to the exact significance of the term *telangiectasis*. If it is to have any definite application, it should be limited to those dilatations and new growths of blood-vessels which are developed in later life. It would appear, therefore, that a division of angioma into (1) nævus vasculosus, including the congenital vascular new growths, and (2) telangiectasis, embracing acquired vascular dilatations, suffices for the dermatological consideration of the subject.

I. Nævus Vasculosus.

Synonym: Nævus Vascularis; Nævus Sanguineus.

The vascular nævi are present at birth, or they may become manifest only after weeks or months. They may involve the capillaries or small arterial or venous radicles. Only one nævus may be present upon the body, or numbers may exist. In size the nævus may be as small as a pin point, while on the other hand large areas of the body may be involved. Nævi vary in color from a light red to a dark purple; under the pressure of the finger this color will partly disappear, rapidly to return as soon as the finger is raised. The nævus is sometimes perfectly flat and on a level with the skin, or its surface may be raised, rugous, warty, or presenting actual little tumors of a darker hue. When the growth is elevated above the surface it will often become more turgescent by straining or crying, and the like. Pulsations synchronous with the heart's action are occasionally remarked in the elevated nævi, and in such cases upon auscultation over the tumor a bruit may be heard. According as nævi present one or the other of these peculiarities they have received special names. Often at birth a small central red point is observed, radiating from which are numerous more or less sinuous red lines; this is the **nævus araneus**, which may remain stationary or increase in size as the child grows. At other times the nævus occurs as a red or bluish discoloration of any shape or size, which often enlarges somewhat in the first months of life and then remains stationary; this is the *port-wine mark*, and in some instances it has been observed occupying extensive areas, as one side of the face or a whole member. In other cases the surface of the nævus is covered by a more or less dense growth of hair, constituting **nævus pilosus.**

A nævus may be so much raised above the surface as to form a veritable tumor, usually easily compressible, but which rapidly swells out again; such tumors are generally of a bluish or purplish color. The term angioma cavernosum has been applied to them on account of their reticular structure. Sometimes an angioma will lie entirely in the subcutaneous tissue, affecting the skin only by raising it over the site of the tumor. Rarely an angioma commences as a very hard pea-sized mass lying in the subcutaneous tissue, not at first involving the skin; as the tumor increases in size the integument over it becomes adherent and of a bluish color, while the epidermis may be thickened and fissured. Some writers limit the term angioma cavernosum to this variety of nævus.

Vascular nævi may also occupy the mucous membrane, where they present the same clinical phenomena which are manifested when the skin is involved.

Angiomata may occur on any part of the body, but show a predilection for the scalp, face, and extremities, and it is this involvement of the exposed regions that often constitutes the chief importance of the affection. The course of a nævus, whatever may be its form, is a matter of great uncertainty. In some instances those present at birth disappear soon afterward, but, on the other hand, they may rapidly attain large proportions. Occasionally a flat nævus may develop into one of the raised, pulsating forms. Various complications may occur with nævus vasculosus; the skin covering the tumor sometimes becomes ulcerated, and alarming and even fatal hæmorrhages may take place. A like result may be brought about by traumatism. Very rarely gangrene develops in and about the angioma.

As a rule, vascular nævus is unattended by any subjective symptoms. In those cases in which a murmur is present the continual hum may prove very annoying if the nævus be upon the head. If the tumor has attained large proportions, it may cause violent neuralgic pains by pressure upon peripheral nerves.

II. Telangiectasis.

Telangiectasis is an acquired condition which usually develops at a somewhat advanced age. This affection is always of the nature of a secondary phenomenon, though the primary cause is sometimes difficult to ascertain. The usual sites of telangiectasis are the face, especially about the cheeks, nose, and eyelids, the upper part of the trunk, and the neck. One of the most common forms of telangiectasis consists of a central spot of a bright red-color, from a pinhead to a pea in size, usually not elevated, radiating from which are thin red lines; in fact, in appearance exactly like nævus araneus. In other cases small red or bluish vessels may be seen coursing in all directions over a limited area of the skin. Such lesions are especially common on the cheeks of elderly persons, and about the noses of those suffering from acne rosacea. In still other cases the telangiectasis occurs as a red or purple elevation, which may be of the size of a small pea, with a perfectly smooth surface; or attaining larger proportions, it may become tuberculated so as to be likened to a raspberry. Though telangiectases are most often found in a limited area, yet in rare cases they have been observed occupying almost the whole cutaneous surface. Telangiectases may occur upon the mucous membranes; upon the ocular conjunctiva they are by no means rare, and are frequently observed about the anterior nares.

When telangiectases have once formed, others are likely to appear in their neighborhood or in other parts of the body, unless the original cause of their production is removable. The individual telangiectasis occasionally disappears spontaneously, but more often it slowly grows by the gradual involvement of adjacent vessels.

Pathology.—The morbid anatomy of nævus vasculosus varies according to the kind of growth present. The simplest structure as well as the most complicated may be found in the same growth, and this accounts for the impossibility of basing a classification upon anatomical grounds. Even in the ordinary flat nævus not only is there an increase in the number of the vessels, but their walls are thickened, and in portions present varicosities. There is an exaggeration of this condition in the neighborhood of hairfollicles, glands, and masses of fat, where the vascular supply is normally most generous, so that the nævus may seem to be formed of lobules. The prominent and pulsating nævi are made up of a mass of veins and arteries confusedly intertwined. In the so-called cavernous tumor there are numerous irregular intercommunicating cavities formed by trabeculæ of connective tissue and lined by endothelium. The anatomy of telangiectasis is similar to that of the simpler forms of nævi, save that the new growth of blood vessels is not so prominent a feature.

Etiology.—The causes of angioma are very obscure. To say that they are aberrations in the processes of fœtal development is simply to shift the difficulty without offering any real explanation.

Some writers still hold to the belief that maternal impressions during pregnancy have a causal relation. As birth-marks are so common, and as few women fail to experience some emotion during pregnancy to which they can afterward attribute the mark upon the child, it is not strange that such an origin should often be attributed to a nævus.

Telangiectases may result from any general cause that produces long-continued congestion of the skin, such as disturbances of the circulation from heart lesions, diseases of the kidney and liver, emphysema and other chronic affections of the lungs, etc. They may arise also from local obstructions to the circulation, as at the periphery of scars, or over new growths. They may occur with chronic, inflammatory affections of the skin, as in acne rosacea and lupus erythematosus. They are especially to be noted as occurring in Kaposi's disease.

Diagnosis.—As a rule, there can be no difficulty in recognizing the true nature of angioma. The peculiar color, partly fading under pressure, and the discovery of dilated vessels, most frequently at the margin of the affected area, together with the history, will serve for the diagnosis of the flat form of nævus vascularis. In the prominent variety the color, the pulsation, if present, the ability to force out the contents of the tumor by pressure, which rapidly refills, mark the vascular origin of the growth. In those cases where the subcutaneous cavernous tumor has a very dense capsule, it may be clinically indistinguishable from a fibroma. In some rare instances an encephalocele occurring at the base of the nose might be mistaken for an angioma, but this tumor can frequently be entirely reduced by pressure, when cerebral symptoms, such as convulsions or unconsciousness, may result. The pulsations of an encephalocele are apt to occur synchronously with expiration, and often the fissure in the frontal bone, through which the contents of the skull have escaped, may be felt.

Treatment.—A great many surgical procedures have been instituted for the cure of angioma. Sometimes serious operations are required by the size or rapid growth of the tumor, such as ligation of the main arteries supplying the growth, or even amputation of the affected part. As far as the angiomata concern especially the dermatologist, the forms of treatment most employed may be considered under the following heads:

1. **Compression.**—This method finds a very restricted field, as it is both slow and inconvenient, and can be used only where a bone furnishes counterpressure, as upon the forehead or scalp. Small flat nævi, or the smaller forms of the elevated sort, are those most suitable for this method of treatment. Compression is usually applied by a firm compress, such as a bit of cork covered with cloth, kept pressed upon the desired spot by

means of a properly arranged rubber band. The amount of pressure and the length of time it is to be applied are matters which must be determined for each case. This method has the advantages that it seems to the patient less of a surgical procedure than most others, and that it leaves no scar; but it often fails, and hence can not be relied upon.

2. **Destruction by Chemical Agents.**—When a nævus is very superficial it may be destroyed by the application to the surface of a variety of chemical caustics, which by the inflammation they set up cause an obliteration of the vessels. Ethylate of soda, freshly prepared, is recommended as one of the best remedies of this class; it should be applied to the surface with a glass rod; after some days the eschar thus formed will separate, and the effect can then be judged. Frequently an entire cure is not accomplished until the application has been repeated several times. Many other chemicals have been used in a similar manner, among them nitric acid, acid nitrate of mercury, and chloride of zinc. To the writer's mind this method is not to be compared in value to electrolysis where the latter is applicable, for with chemicals the amount of inflammation set up can not be accurately gauged, and more scarring may result than is desirable or necessary to effect the cure.

The injection of strongly irritating chemicals, such as perchloride of iron, tannin, or carbolic acid, into the nævus is a dangerous procedure, and one not to be recommended, though it is frequently quite efficient in bringing about a cure; for often a severe sloughing has followed this method of treatment, and occasionally sudden death has occurred from some of the injected fluids passing into the general circulation. Where safer methods can be employed, an operation which may be attended by such ill results can not be recommended.

3. **Extirpation by the Knife.**—If a vascular nævus be of limited area, and so situated that tissue can be spared without secondary distortion, its removal may be accomplished by the knife. Where this method is used, the incisions should be made well outside the diseased tissues, as otherwise the hæmorrhage may be severe. The advantages of this mode of operating are that it is sure, expeditious, and, when rightly performed, leaves only a linear scar.

4. **Vaccination.**—In small, flat nævi good results have been obtained by inoculation of vaccine virus upon the nævus. This method of treatment is uncertain, and the resulting scar may be unsightly.

5. **Coagulation and Inflammatory Obliteration by Electricity.**—For the cure of angiomata electricity may be applied in two ways—as electrolysis or the galvanocautery; for the great majority of cases belonging to the province of dermatology one or the other of these methods will constitute the ideal treatment.

Electrolysis is best suited to the destruction of flat nævi, small elevated tumors, and telangiectases. The only objection to the operation is that, as the number of vessels affected by each thrust of the needle is so small, the sittings are protracted and must frequently be repeated. As the operation is attended by some pain, which in children will necessitate anæsthesia, in them the use of electrolysis must generally be restricted to the marks which have a very small superficial area. The writer makes use of the negative pole armed with a slender steel needle, while a sponge electrode is attached to the positive pole. Some operators reverse this use of the poles. A current, such as may be derived from twenty cells of an ordinary galvanic battery, is sufficient in most cases. The needle is passed into the nævus more or less deeply, according to the nature of the growth, and the positive pole then applied to some convenient part of the body. The color of the nævus for a greater or less distance around the needle will be seen to blanch and turn white, and this, together with the destruction occurring immediately about the needle, will be the index of the time the current is to be passed. The number of times that the needle is inserted at each sitting will depend on the size of the nævus and the amount of coagulation produced by each insertion. The complete cure can rarely be effected in one sitting, as the ultimate effect can not be judged till the lapse of several weeks.

For telangiectases and the nævus araneus, the so-called spider cancer, nothing succeeds so well as the electrolytic operation, as originally suggested by the writer (Archives of Dermatology, October, 1879). By means of an appropriate needle-holder a fine jeweler's bristle is attached to the negative pole of a galvanic battery, and then inserted into the vessel to a proper depth—that is, just sufficiently to puncture it; the circuit is then closed by the patient touching with the tips of the finger the positive (wet) sponge electrode. So soon as the vessels become a white line, which will occur in a few seconds, the fingers are removed from the sponge electrode and the needle is withdrawn. It is important to follow this method of procedure closely, else the operation will be rendered quite painful. If the vessels are long or very large, several punctures may be made.

Some years since (St. Louis Courier of Medicine, March, 1886; see also the author's Manual of Skin Diseases, Lea Bros. & Co., Philadelphia, 1892) the writer advised the use of electrolysis in the treatment of port-wine mark, and, although far from perfect, it still holds the first place in his favor.

Small and superficial nævi are readily removed in this way, and even those that are large and deeply seated can be considerably bettered. The various steps of the operation are the same as those just detailed for telangiectases and other forms of angioma. The following quotations, somewhat abridged, are taken from the writer's paper on the treatment of port-wine mark, read before the American Dermatological Association in 1885:

The most important point relating to any destructive operation on the skin is, that the operator should control the destroying agent as much as possible. The writer therefore now uses a single needle, instead of the bundle or crown of needles he formerly recommended. If this single needle is cautiously used suppurative areas may be avoided, as also the keloidal scars that sometimes follow the operation with the bundle of needles. The operation is thereby rendered more tedious but much safer. It is a tedious matter under any circumstances; for when the puncture is made, the surrounding region becomes so blanched that we are at a loss to know where to make the next one to the best advantage; and the next day, for a considerable space around the place operated upon, there is an inflammatory areola, and perhaps crusting, which obliges us to wait for a number of days before beginning again. Thus it is impossible to form an accurate estimate of the result in a given space for at least six weeks or more; and therefore, when a suitable amount of work has been done, it is best to dismiss the patient for a season. No one pretends for a moment that in a port-wine mark of any magnitude this operation is going to leave a normal skin behind it. In the majority of cases we aim to produce minute, multiform scars, which in time become white, and thus obliterate the nævus.

It often happens, however, that a large area is permanently blanched without scar by apparent obliteration of vessels at its periphery. In some cases intense brown pigmentation takes the place of the red surface, which, however, gradually undergoes absorption, leaving the skin white. This generally occurs on parts where the skin is thin. Where one needle is employed the resulting scars are usually thin, supple, nondepressed, in no case leaving behind elevated knots and cords such as result from galvanocautery.

Very often it is better, in a cosmetic way, to endeavor merely to lighten the color of the mark rather than to convert it into a dead-white patch. Of course, where the mark is quite small, a thin white, and even glistening cicatrix is not especially objectionable. It is not uncommon to find that in an apparently obliterated wine-stain after a while dotlike telangiectases will appear here and there. They must be again destroyed.

The galvanocautery finds its greatest use in the larger elevated nævi. A rather fine point should be used, which is heated only till it is a dull red, since the use of a white heat is apt to be followed by a hæmorrhage. The point is thrust into the tumor a number of times in various directions, till the surgeon judges that a sufficient effect has been produced. Only after healing from the inflammation which follows this procedure is completed can the ultimate effect be determined. It may be necessary to repeat the operation several times. Whether electrolysis or the galvanocautery be used, it is necessary to observe the strictest antiseptic precautions during the operation, and afterward an antiseptic dressing should be applied until healing has occurred.

Aside from the methods of treatment which have been somewhat particularly mentioned above, there remain to be enumerated some others which have been recommended, but are now used only when the better methods can not be applied. Strangulation of the vascular tissue may be caused by variously applied ligatures, or ligatures and harelip pins combined. This method is tedious, painful, and often leaves large scars. Repeated multiple superficial incision (Squire) has not given generally satisfactory results, though much was at one time said of its efficacy.

The continuous application of cold is uncertain, painful, and may even cause sloughing of the tissues.

Passing threads through the angioma for the purpose of causing inflammatory obliteration is no more successful than other methods, and unless most careful attention is paid to antiseptic detail serious trouble may supervene.

It is needless further to extend the discussion of the various methods of treating vascular tumors, since those which seem to the writer most generally useful and safest have been considered.

Prognosis.—Though many angiomata present at birth disappear with advancing life, a certain proportion not only do not diminish in size, but grow steadily larger. A birth-mark which was flat in the beginning may develop into a turgid, pulsating angioma. Not only may the disfigurement caused by a vascular nævus prove very annoying to its possessor, but life may even be endangered by hæmorrhage from ulceration or traumatism. For these reasons no birth-mark of a vascular character should be regarded as a trivial affair, but all should be carefully watched, and if no tendency is shown to spontaneous disappearance, treatment for the cure of the condition should be undertaken. Telangiectases, though readily destroyed by the means noted above, are apt to recur, unless the causes leading to their production can be removed.

ANGIOMA SERPIGINOSUM. (PRINCE A. MORROW.)

Synonyms; Infective Angioma; Nævus Lupus (Hutchinson).

Definition.—A disease anatomically allied to telangiectasis, characterized by the appearance of minute, bright red, vascular points disposed in groups, which show a tendency to clear in the center while spreading peripherically, forming annular lesions.

This disease was first described and pictured by Hutchinson (Archives of Surgery, vol. i, Plate IX) as "a peculiar form of serpiginous and infective nævoid disease." Only three additional cases have been recorded, one each by Jamieson, Lassar, and Warren Fay respectively. Descriptions of all these cases appear in the Archives of Surgery, vols. i, ii, and iii, to which we are indebted for our knowledge of its clinical features.

Symptomatology.—The eruption consists of bright red vascular puncta, resembling "grains of cayenne pepper," arranged in more or less definitely defined rings or circles. The disease advances by peripheral spreading of the circinate patches and the development of new points beyond them, which Hutchinson describes as "infective satellites." The rings rarely exceed half an inch in diameter, but by their coalescence large areas are involved with gyrate borders. In color the dots or points vary from a vivid to a purplish red, which pales on pressure, but in some of the spots, composed of small tufts of vessels of a deep venous tint, no amount of pressure caused the color to alter.

The evolution of the disease is slow, with accesses of rapid advance. As in other forms of angioma, there is an entire absence of subjective symptoms. In Jamieson's case the eruption was composed of minute puncta, closely set together so as to form groups, some isolated, others arranged in lines. In the spaces between the grouped puncta the skin was stained to a faint pink. They were scattered over the deltoid region, on the extensor and flexor aspects of the upper arm, and could be traced over the radial side of the wrist on to the back of the hand, as far as the root of the thumb and forefinger. On the right side several groups could also be seen along the inferior margin of the fifth rib, from an inch inside the nipple to the margin of the sternum, the largest group lying next the nipple. In Lassar's case the eruption began at the age of nine months, on both cheeks, in pea-sized patches, which soon attained the size of a florin. Later on, groups appeared on the ears, but did not spread much. A year later the eruption extended to the arm, and in eight weeks it had spread from above the elbow over the whole of one side of the forearm and to the hand. On the hand the changes were more superficial than in other parts. There were minute tufts of dilated capillaries, arranged partly in rings and partly in dots. The condition extended to the end of the thumb, becoming fainter and fainter as it advanced. In Warren Fay's case the right leg was chiefly affected, the condition extending continuously from the heel to the knee, with a separate patch on the front thigh above the joint. The back of the limb was covered over with minute dots of a deep red, almost purplish tint, which were unaltered by pressure. In this case the spots were not arranged in rings, or in any other definite kind of grouping. In Hutchinson's cases the eruption was distinctly circinate, and extended from the deltoid region to below the elbow.

Etiology.—Of the four reported cases three were females and one a male. In all the cases except that of Jamieson, a boy of sixteen years of age, the affection began to manifest itself during infancy. The causes of this disease are unknown. In only one case was there a history of congenital nævus—that of Hutchinson—in which the condition developed from a small port-wine mark on the back of the arm, soon after birth. In Lassar's case, convulsions consequent on deficient dentition preceded the eruption. In Jamieson's case the eruption followed violent gymnastic exercise; in Fay's case it developed at two years without any apparent cause.

Pathology.—The pathology is obscure. Hutchinson regards it as a near ally of the lupus family, from the infective character of the process, its tendency to serpiginous spreading, its proneness to produce satellites, and to leave superficial scars. This latter tendency, it would seem, however, is not an essential feature, as it was not remarked in the other cases. Lassar's case has been diagnosticated by him as lupus erythematosus. The only study of the anatomical characters of the changes was made by Dr. Edington from a piece removed from the arm of Jamieson's patient. "The horny layer of the epidermis was normal, but processes ran down from this in the spaces between the cones, deep into the corium. The vascular loops at the apices of the papillæ were dilated into wide spaces, which still contained blood." The condition was regarded by him as that of a very superficial capillary nævus.

Diagnosis.—The clinical characters of serpiginous angioma are sufficiently distinctive to render the diagnosis easy. The multiple telangiectases, which are sometimes arranged in a stellate form, are distinguished by their dendritic character and the absence of any serpiginous tendency.

Treatment.—The multiplicity of the individual lesions and the extensive surfaces involved render the usual operative measures for angioma impracticable. Crocker recommends electrolysis along the border of the affected area, in order to produce occlusion of as many vessels as possible along the spreading edges and in the outlying puncta.

XERODERMA PIGMENTOSUM. (W. A. HARDAWAY.)

Synonyms: Angioma Pigmentosum et Atrophicum (Taylor); Atrophoderma Pigmentosum (Crocker); Dermatitis Kaposi (Vidal); Melanosis Lenticularis Progressiva (Pick); Liodermia Essentialis cum Melanosi et Telangiectasia (Neisser).

Definition.—Xeroderma pigmentosum may be defined as a progressive affection of the skin, occurring for the most part in children, often of the same family, and characterized by polymorphous lesions, the tendency to malignant new growth, and, after a variable period of time, ending in death. The title given at the head of this article, which was originally employed by Kaposi as a designation for this disease, is the one now in common use. This affection should not be confounded with the xeroderma of Wilson, which is merely a mild form of ichthyosis.

Symptomatology.*—This curious and formidable malady was first-described by Kaposi in 1870, in a short account of two cases to be found in Hebra's Text-Book of Skin Diseases, and subsequently at greater length in a memoir read before the Academy of Medicine in Vienna (Wien. med. Jahrbuch, October, 1882). In 1874, Geber (Vierteljahr. f. Derm. u. Syph., 1872, p. 2) gave a full account of these cases under the title "A Rare Form of the Nævus of Authors." In 1877, R. W. Taylor read a paper at the first meeting of the American Dermatological Association, in which he gave the histories of seven cases; and in 1878 he made a further report on the condition of these patients before the same society (see especially Taylor's article in the Medical Record, New York, March 10, 1888). A number of important contributions were made by Duhring (Am. Jour. Med. Sciences, October, 1878), Neisser (Vierteljahr. f. Derm. u. Syph.), Vidal (Annales de Dermatol. et Syph. 1883, tome iv), Pick (Vierteljahr. f. Derm. u. Syph., 1884, p. 3), Crocker (Medico-Chirurgical Trans., London, vol. lxvii, 1884), White (Jour. Cutan. and Ven. Dis., December, 1885), Dubois-Havenith (Jour. de Méd. de Bruxelles, October, 1885), Elsenberg (Archiv f. Derm. u. Syph., 1890), and other authorities; and besides there have been many interesting reports and discussions before the French and German dermatological associations (1889).

The disease usually first develops in early childhood—between the first and second years—by an attack of diffused erythema, or else in the form of small, measles-like papules. This congestive rash appears primarily on the face, especially about the nose and under the eyes, and, becoming uniform, rapidly spreads downward to about the level of the third rib. The child's health at this time is normal, and the erythematous blush is usually regarded as the result of sunburn, more particularly as it is apt to be evoked by the sun's rays in the warm seasons of the year.

This congestive stage may rapidly disappear, or else may continue from one to several months, to be followed by an eruption of pigmented spots having the appearance of common freckles. The pigmentations vary in size from a pin-point to a lentil, and in color from a light fawn to a dark brown, or even black. Large blackish and irregular discolorations are sometimes to be observed on the face. The palms, soles, and mucous membranes generally escape, although the arms and legs, being exposed in children, may be attacked. Subjective symptoms are usually lacking.

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* For the description of the symptoms of xeroderma pigmentosum the writer is especially indebted to R. W. Taylor's masterly memoirs, and also for many details throughout the article he is under obligation to the able and painstaking review of Archambault, contained in his *Thèse de Bordeaux*, 1890.

Another most striking clinical feature of the disease is the appearance of small red spots, or telangiectases, which appear interspersed among the pigment spots, or seated upon small white macules. Taylor, whose opinion upon the course of this disease demands unusual consideration, insists that the pigmented spots follow exactly upon the sites of pre-existing red spots, and that therefore the red lesions are the forerunners of the freckle-like discolorations.

The subsequent course of the two orders of lesions first mentioned—that is, the pigmentations and telangiectases—is variable. "They are erratic, they come and they go, they have periods of exacerbation and remission, but their hold is never lost. If one disappears it is replaced by another or several. Thus as the child grows older its disfigurement becomes more or less rapidly worse, the disease relentlessly pursuing" (Taylor).

After an average duration of about two years, although this period of time may be much extended, the stage of atrophy supervenes. Crocker believes that the pigment disappears in some spots and leaves white atrophy, and that the telangiectases are produced in consequence of obliteration of neighboring vessels. Taylor, on the contrary, urges that the atrophy of the skin takes place in proportion to the growth and atrophy of the telangiectases, and that the atrophy is most rapid where their development is most active—as, for example, upon the forehead, scalp, eyes, nose, mouth, and ears.

The integument loses its elasticity, is thin and cicatricial-looking, becomes pale, and is devoid of glandular orifices, thus in a measure justifying the term *xeroderma* or *parchment skin.* In consequence of this shrinking much disfigurement results, such as eversion of the lids, xerosis of the corneæ, narrowing of the nasal and oral cavities, and deformity of the ears. The skin is apt to become dry and rough, the scalp pityriasic, and pustules and crust covered ulcers form especially about the face. The ulcerations, Crocker thinks, come from the purulent discharge from the eyes, and are extended by auto-inoculation.

The superficial ulcerations just mentioned do not make their appearance until the disease has existed for some time; but in the course of four or five years certain hypertrophic changes are to be noted. This is the period of new growths. Some of the tumors are benign, while others are malignant. They usually have their origin in warty patches resembling keratosis senilis, that spring from the pigmented spots. These warty excrescences may retain their innocent characters for a long time, or they may disappear to return again, or in some cases may remain away.

In certain situations, however, as upon the edges of the lids and at the junctions of the mucous membrane and skin, they are apt to increase in size, and ultimately form sessile or pedunculated tumors of variable size and numbers, which, after the shedding of their horny epidermis, assume a fungating appearance. Some of the tumors become strangulated, and leave cicatrices in their wake, or they are destroyed by ulceration and present atonic ulcers that finally become malignant. In fact, the final outcome of all these new formations, although it may be long delayed, is in malignancy of some form, the most frequent being the epitheliomatous degeneration, although various other types, such as sarcoma, etc., have been observed.

The lymphatic glands are rarely implicated, and metastasis to internal organs is uncommon.

After the development of the tumors the tenure of life is uncertain; some live but a few months, others many years. Ultimately the growths determine a marasmus under which the patients succumb, or else, directly or indirectly, they fall victims to the horrible ravages of the disease.

Various departures from the course of the disease as above outlined are to be noted; for example, in some cases the preliminary erythematous rash is absent, or at any rate not observed.*

The extent of surface involved also varies. Usually the pigmentation is sharply limited, but it may be much more extensive, and even include the scalp. Discolored spots have been observed on the palms and soles, on the conjunctivæ, and on the lips and tongue.

The red spots may be limited in number or they may be very numerous, and the atrophy with its corresponding deformity greater or less.

The tumors may be comparatively few in number, or exceptionally quite numerous, in one reported case there being at least eighteen such new growths. In physical appearance the tumors affect no special or invariable type; they may be red or purple, sessile or pedunculated, fungating or raw; smooth, sometimes encrusted, again oozing, and often the seat of hæmorrhage (Taylor).

Some of the more usual features of the disease may be absent. Thus, in a case of Kaposi's, occurring in a man of twenty-five years, there were only freckles of different sizes present upon which carcinomata had developed. While most cases begin during the second year of life, the disorder has been recognized at the sixth month, while in Schwimmer's patient its appearance was delayed until the forty-fifth year.* Later experiences, therefore, do not bear out Taylor's skepticism as to the genuineness of cases developing late in life.

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* Brayton (Jour. Cutan. and Gen.-Urin. Diseases, October, 1892) reports a case in a child of six months, one of several cases in the same family, in which atrophic macules constituted the first symptom observed, there being neither preliminary rash, pigmentation, nor telangiectases. Pigmentation developed subsequently.

Pathology and Morbid Anatomy.—Little or nothing is known of the essential nature of xeroderma pigmentosum. The fact of its attacking several members of the same family, while not apparently a hereditary disease, very naturally suggests the idea of a parasitic origin and contagion, but the researches of Funk and others in this direction have borne but little fruit.

On theoretical grounds, Crocker regards the disease as an atrophic degeneration of the skin, dependent upon a primary neurosis, to which there is congenital predisposition. Various other explanations have been attempted.

Dr. Pollitzer (Jour. Cutaneous and Genito-Urinary Dis., April, 1892) gives an admirable account of the histological investigations of Kaposi, Neisser, Vidal, and others, which, somewhat abridged, is as follows: The first stage consists in hyperæmia. Accompanying this vascular dilatation there is an exudation of serum ; leucocytes pass out into the tissues, together with red blood-corpuscles. Thus we have the material for the next step, viz., pigmentation. Since there is increased tissue supply, there follows increased connective-tissue production, which passes on into sclerosis.

This condensation of the connective tissue in some parts cuts off by pressure the blood supply in other parts, while at the same time endarteritis occurs in many vessels, and atrophy results. Collateral hyperæmia produces telangiectasis. The warty growths are generally granulomata, commonly papillomatous in their structure, and are covered by a thickened epidermis with long rete proliferations into the body of the tumor. The superficial ulcerations, like the distortions of the muco-cutaneous outlets, are purely secondary lesions—that is, as the result of the sclerosis and atrophy.

Nearly every type of malignant growth has been described by observers in this disease, the epitheliomata, however, predominating. In a specimen from one of Crocker's cases examined by Pollitzer, it was possible to see in one section both sarcomatous and carcinomatous types of growth.

Etiology.—The etiological factors concerned in xeroderma pigmentosum are but little known; indeed, beyond the obvious fact of congenital predisposition the whole subject is wrapped in much obscurity.

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* A peculiar case of cutaneous atrophy reported by the writer some years ago (Trans. Am. Derm. Ass'n, 1884) was not regarded as an example of Kaposi's disease, presumably on account of its late development (about the sixteenth year) and extensive involvement of the surface, although the patient had the pigmentation, atrophy, and telangiectases. Moreover, his sister was similarly affected.

So far as observations have extended the disease has not been found to be hereditary, but it shows a remarkable tendency to prevail in families. For example, in nine families there were twenty-six cases. Sometimes only the males are attacked, or, on the other hand, only the females, but this is by no means a rule.

The malady generally develops in the first or second years of life, rarely after the third, but cases are recorded in which it was first noted as early as five months, and as late as the forty-fifth year (Schwimmer).

The social state and hygienic conditions of the patients seem to be without influence, and neither race nor climate appears to be a bar to its acquisition. A certain number of the patients have come from the country, and on this account it has been suggested that out-of-door exposures are to a degree responsible; indeed, the sun's rays have been credited with the production of the disease (Unna); and attention has been directed to the fact that the initial symptoms are prone to commence in the spring and summer.

Diagnosis.—Of late years the various symptoms of xeroderma pigmentosum have been so minutely described, and the clinical features so faithfully reproduced in excellent illustrations, that the diagnosis has become a comparatively easy matter. Indeed, in a fully developed case with its pigmentations, telangiectases, atrophies, and new growths, the picture presented is so striking and so unlike any other disease of the skin, that the attention is at once attracted. Yet, by taking into consideration only single features, and neglecting the complex of symptoms presented, it is possible to mistake the pigmentations for summer freckles, the preliminary rash for an ordinary erythema or measles, the vascular dilatations for vascular nævi, and the ulcerations for syphilis or lupus. Of course, at the onset of the disease everything beyond a conjectural diagnosis is impossible; but later on, when there are present several of the significant symptoms, the task is considerably lightened.

A superficial study of a case may also cause it to be confounded with scleroderma; but the mode of its inception, the character and seat of the atrophy, and the early development of the pigmentation and telangiectases, are sufficiently distinctive, and after the appearance of the tumors a mistake would be impossible.

Prognosis.—The prognosis is highly unfavorable, and in the majority of cases death after a few years is the invariable end. In some instances the fatal termination has been much delayed; in one recorded case the tumors did not appear for thirty years. Archambault, as the result of the study of fifty-seven cases gathered from various sources, presents the following facts: In thirteen cases, where the histories had been followed up, death was due to cancerous cachexia. One child succumbed at five and a half years; seven, at eight to fourteen years; three, at six to twenty-five years; one, at forty-two years; and one, at sixty-one years.

Treatment.—Internal treatment, beyond the administration of remedies to meet the symptomatic indications that may be presented from time to time, is of no value as regards the ultimate course of the disease. All the usual remedies, such as arsenic, iodine, etc., have been tried.

On the other hand, much can be accomplished by timely and appropriate local measures, both as regards alleviating annoying and painful symptoms, and perhaps even in staying for a while the progress of the disease. Crocker, who thinks that the eye discharge produces the ulcers on the face by direct inoculation, strongly advises the use of boric acid lotion for the conjunctivitis and ammoniated-mercury ointment for the recent ulcers. Old ulcers should be scraped out, cauterized, and then dressed antiseptically. Prominent tumors should be removed by the knife or galvanocautery.

LYMPHANGIOMA. (C. F. HERSMAN.)

Definition.—By the term *lymphangioma* is meant a growth consisting of enlarged lymph-vessels which did not previously exist in the affected area.*

Symptomatology.—It is a most difficult matter to give any comprehensive and succinct account of the lymph-vessel tumors, for we are just now at an epoch when not only constant additions are being made to our knowledge of this obscure subject, but much of the past literature must be carefully revised, and some even entirely discarded.

The disease described by Hebra under the name **lymphangioma tuberosum multiplex,** which has been quoted in all text-books as one of the principal forms of lymphangioma, and in many has been the only form recognized, must now be dropped from this category and assigned to an entirely different nosological position.

Hoggan was the first to suggest that Hebra's case probably was not an affection of the lymphatic system. More recently the investigations of Balzer, Jacquet, Török, Besnier, and Brooke (British Journ. Derm., September, 1892) make it very probable that the so-called lymphangioma tuberosum multiplex really belongs to the class of benign epitheliomata, and corresponds to the recently recognized affection of the sweat-glands described by Jacquet and Darier, under the title of *hydradénome eruptif.*

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* It practically often becomes a matter of impossibility to determine whether the vessels observed are really new formations or merely previously existing vessels in a state of dilatation. Any one who desires to know somewhat of the difficulties of accurate classification in the subject under consideration has but to investigate the works of Samuel C. Busey (Occlusion and Dilatation of Lymph Channels). On this account the writer has thought best to consider under the title of this article also the lymphangiectases.

Philippson (Monatsheft f. prakt. Derm., 1890, vii-xi) has recently attempted to show that these cases of hydradenoma should be regarded as benignant epitheliomata which are accompanied by colloid degeneration.

When we consider that the appearances in pathological conditions of the blood capillaries do not always suffice to distinguish them from affected lymph channels, it can readily be understood how certain hæmatangiomata have been erroneously reported as lymphangiomata; thus Besnier and Doyon would regard the case reported by T. C. Fox, under the title of "A Case of Lymphangiectasis of the Hands and Feet in a Child" (Illustrated Med. News, 1889), as really a case of angioma with horny covering, due to its localization on the hands and feet. Török (Monatsh. f. prakt. Derm., xiv, 5) also eliminates this case from his classification of lymphangiomata. Besnier classes as angiomata also certain cases of grouped vesicles containing serum with lymphatic corpuscles, reported by Török and by Schmidt as circumscribed lymphangiomata. According to Besnier, these cases do not begin in the lymph radicles, but as aneurisms of the blood capillaries, which, rupturing, form spaces in which the blood gradually undergoes the serous transformation.

A number of schemes for the classification of true lymphangiomata have been proposed; no one of them can be considered as permanent, but all must be subjected to modifications as further investigations widen our knowledge. Probably the most comprehensive division is that offered by Chipault (Gaz. des Hôp., 1888, p. 1329), who divides the lymphangiomata according as they affect the lymph ganglia, the main trunks, or the plexuses, with subclasses to correspond with the depth or superficiality of the parts involved. The classification of Wegner (Arch. f. klin. Chir., 1877, t. xx, p. 641) best meets the needs of cutaneous lymphangiomata, and is therefore used. His arrangement is:

1. Simple lymphangioma.
2. Cavernous lymphangioma.
3. Cystic lymphangioma.

Simple Lymphangioma.—The first variety of the above classification is of more interest to the surgeon than to the dermatologist, as it is so often accompanied by fatty tumors. Many of the so-called congenital pachydermias belong here. Simple lymphangiomata may occur upon any part of the body as circumscribed, variously sized, elastic swellings, the skin over which may be of the normal color, or may have a purplish tinge. At times dilated lymph vessels may be observed passing into such a tumor. These tumors often feel to the touch like lipomata. If ulceration occur in the skin covering a simple lymphangioma, or a puncture be made, lymphatic fluid escapes. Very frequently there is a hypertrophy of the surrounding tissues.

Such growths occupying certain areas have received special names. On the lips the affection is called *macrochlilia*, and on the tongue *macroglossia.* In some cases vesicles have been remarked in the skin covering a simple lymphangioma, which upon rupture discharge considerable quantities of clear or milky lymph.

Lymphangioma Circumscriptum.—The form of cavernous lymphangioma which usually affects the skin is that which has been described under the name *lymphangioma circumscriptum.* Although a number of cases of this affection have been reported, the disease is still rare enough to be regarded as a clinical curiosity.

In most of the reported cases the malady has begun in the early years of childhood. Various portions of the body in these cases have been affected, such as the neck, the shoulder, the scapular region, the back, the buttock, the thigh, the hand, the leg, the foot, the conjunctiva, and the genitals. The lesion of the lymphatic system is sometimes accompanied by other evidences of faulty development. In a case reported by Besnier and Doyon (Mal. de la Peau, p. 380) the lymphangioma developed on or about the site of a vascular nævus present at birth.

When the disease is fully developed it presents an appearance striking and unique. One or more patches, varying in size from a dollar to an area larger than the palm, will be seen raised somewhat above the skin, which at the first glance seem to be made up of small, closely packed warts. The surface presents a more or less uneven, rough aspect, and varies considerably in different cases in color, being sometimes of a dirty-gray and at others of a blackish hue. On a more careful examination, the seeming warts are found to be really vesicular formations, varying in size from a pinhead to a pea, so closely packed together that by mutual pressure their form is very angular and irregular. Though the roofs of these vesicles seem to be formed by the entire thickness of the epidermis, yet in many the opalescence due to their fluid contents is plainly to be seen. That the contents of the little elevations is fluid in character, is most clearly to be noted at the apex, where the lesion is semitransparent. In some portions of such a plaque it will be noticed that the epithelium has become so roughened and thickened that the transparency is no longer present. It is the predominance of such lesions that gives to the patch its peculiar warty aspect.

On some of the vesicles minute twigs of blood-vessels may be seen coursing, and here and there a small red telangiectasic spot may be observed, from which, spreading over the roof of the vesicle, run numerous red lines, forming a veritable nævus araneus. Sometimes a few of the lesions acquire a black or purplish hue, from extravasation of blood into the cavity from the rupture of these little vessels.

The impression conveyed is not that the lesions are true vesicles superficially situated and covered only by the upper layers of the epidermis, but rather that there exist in the substance of the skin small cavities filled with fluid. This idea is further enforced if we examine by touch, for we find the elevations firm, remarkably tough, not easily rupturing. This constitutes the picture of that portion of the eruption which is agglomerated into patches, but surrounding such a plaque are outlying lesions, which, because they are of more recent formation, are more decidedly vesicular in appearance. In color they may be pinkish, reddish, or yellowish, and their epidermic covering is not rough or warty. If one of the lesions of a plaque or an outlying vesicle be pricked, a variable amount of clear liquid escapes; sometimes this will not exceed a few drops. In a case (Journal of Cutaneous and Genito-Urinary Diseases, June, 1892) presenting in a well-marked degree all the peculiarities just noted, which the writer had the opportunity of observing, rupture of a vesicle was followed by a discharge of fluid often lasting two or three hours. The fluid which thus escapes contains lymph corpuscles. Sometimes there is an increase in bulk of the part upon which the lymphangioma circumscriptum is situated.

In the case of Besnier and Doyon's, cited above, the part involved was subject to periodic attacks of an erysipelatous character, after each of which the lymphangioma grew in extent and in depth.

Lymphangioma circumscriptum persists indefinitely; in fact, there is no reason to think that a spontaneous cure would ever result, but, on the other hand, there is a tendency for the malady slowly to progress by the formation of new vesicles and patches.

Cystic Lymphangioma.—The cystic form of lymphangioma belongs essentially to surgery, and will therefore be but briefly mentioned in this article. It occurs as large congenital, multilocular cysts, which are of comparative frequency in the neck, where they go by the name of *hygromata colli.*

To complete this brief sketch the writer feels that he must make some reference to **Lymphangiectasis.** Though this condition can not properly on theoretical grounds be classed among the lymphangiomata as defined above, yet practically it is often impossible to determine whether the involved vessels be simply dilated pre-existing channels, or entirely new growths.

The most common form of lymphangiectasis is undoubtedly elephantiasis; but as this affection is classified as a separate disease and fully described in another part of this work, it is here simply mentioned.

Aside from elephantiasis, lymphangiectases are of comparative rarity.

These dilatations of the lymph channels are always the result of some antecedent cause, which it is often of the greatest difficulty to ascertain. It is probable that lymphangiectasis may exist in both an acute and a chronic form, though nearly all the observed cases belong to the latter class.

As an example of the acute form may be mentioned the case of Trelat (Besnier and Doyon, Mal. de la Peau, p. 384). The lesion occurred on the penis of a man who had sustained an injury in that region eight days before; the prepuce presented an ordinary acute lymphangitis with considerable œdema; there were present also prominent vesicles, which on rupturing discharged lymph.

The chronic lymphangiectases develop slowly, and often in an insidious manner; at times their progress is marked by paroxysmal attacks of an erysipelatous dermatitis, as is so common in elephantiasis. The affection nearly always occurs in the lower extremities. The skin lesions consist of nodosities, often arranged in rows corresponding to the course of the lymph-vessels. The skin of the affected region is usually œdematous and indurated, and of a violaceous glazed appearance. The nodules, at first hard, gradually soften at the center, break down and discharge more or less abundantly lymphatic fluid, with the subsequent formation of lymph fistulæ. When the affected lymphatics are more deeply situated they may be felt like knots or strings of beads lying in the tissues. Various secondary lesions are found with this condition of the lymphatics, such as œdema, dermatitis, erythemas of various types, pachydermia, phlegmon, and lesions of the periosteum, bones, and lymphatic ganglia.

Hardaway (oral communication) has seen a case, that of a middle-aged woman, where both thighs, the buttocks, and the lower part of the abdomen presented innumerable varices of the superficial lymph-vessels; these formed raised sinuous lines like cords lying under the skin; the integument was of normal color, but was thickened, and gave a doughy sensation to the touch. The disease had existed for several years, and the patient afterward died from a "cystic degeneration of the kidneys."

Pathology.—The essential elements in simple lymphangioma are numerous large lymphatic vessels lying in a more or less dense stroma of connective tissue. In association with such tumors are frequently found large collections of fatty tissue constituting lipomata. The skin, lying over such a growth, is often hypertrophied in all its elements.

The histological examination of tissue from a case of circumscribed lymphangioma made by Darier (Besnier and Doyon, Mal. de la Peau, p. 318) gave the following result: the epidermis was thinned; immediately below it lay a cavernous tissue with irregular meshes, which corresponded to the sections of intercommunicating cavities. The walls of the cavities were everywhere covered with endothelium having closely arranged cells and nuclei. The trabeculæ which separated the spaces were of variable thickness, and formed of embryonic connective tissue. At intervals there were elongated interpapillary processes extending from the epidermis deeply into the septa.

The cystic lymphangiomata consist, anatomically, of thin-walled cavities which are found microscopically to be lined with endothelium.

Etiology.—In regard to the causes which lie back of the formation of the lymphangiomata we know no more than we do of the essential causes of any of the tumors. Nasse (Ueber Lymphangiome, 1890) denies the conclusion made by Wegner, that passive congestion is the most frequent cause of lymphangiomata. As Török (Brit. Journ. Derm., December 1890, p. 373) points out, the close arrangement of the cells of the endothelium as well as their well-rounded form indicates that the vessels found in lymphangiomata are new growths, and not merely due to dilatations of pre-existing channels; for in the latter event the endothelial cells would not only be flattened but pushed widely apart.

Furthermore, if these formations were merely the result of dilatations we ought often to find them in scar tissue, where the contraction might be presumed to dilate the lymphatic vessels; but as a matter of fact lymphangiomata are never found in scar tissue; they very often, on the other hand, lie in the subcutaneous fatty tissue, which is poor in lymphatics.

The etiology of lymphangiectasis is frequently obscure. In some cases it is due to a dilatation of the vessels caused by the pressure of tumors resting on the larger lymphatic trunks. Other forms of obstruction may bring about the same result. In Hardaway's case, mentioned above, the interference with the venous circulation caused by the chronic kidney disease may be supposed to have been transmitted into the lymphatic system. So, too, in a case reported by Eger (Deutsche med. Woch., 1890, p. 527), the lymphangiectasis may have been due to the obstruction produced by a valvular lesion of the heart; but as such obstructions are often seen without lesions of the lymphatics, it becomes necessary in such cases to assume some intervening cause, as to the nature of which we are at present in the dark.

Some forms of chronic lymphangiectasis may be said to be due to long-continued irritation of a simple character, such as that produced by chronic ulcers, ingrowing toe-nails, professional traumatisms, etc.

In other cases the cause is of a specific nature, and has been shown to be different forms of parasites and micro-organisms which have located themselves in the lymphatics. Thus the filiaria has been shown to be the cause of elephantiasis; tubercle bacilli have been demonstrated in other cases; while the specific causes of syphilis and glanders have been shown to be capable of producing lymphangiectasis.

Mention must be made of the fact that affections of the lymphatic system are of most frequent occurrence in tropical climates and among creoles.

Diagnosis.—In many of the forms of lymphangioma it is often impossible to give an opinion in regard to the nature of the tumor before a microscopical examination has been made. If there be any history of lymphorrhagia, this will be the strongest factor in the diagnosis.

Lymphangioma circumscriptum may be mistaken for a patch of closely aggregated warts, but the demonstration of the vesicular character of the lesions and their lymphatic contents will serve to differentiate.

From all the diseases in which true vesicles occur lymphangioma circumscriptum is distinguished by the thicker walls of its lesions and the presence of lymph corpuscles in the fluid discharged.

Tuholske (oral communication) has seen a case of lymphangioma circumscriptum arranged along the course of an intercostal nerve so as to resemble herpes zoster. In such a case the long persistence of the eruption, the absence of inflammatory signs, and the contents of the lesions, would make the true nature of the lymphangioma plain.

The lymphangiectases are most likely to be mistaken for indolent abscesses, chronic ulcers, or varicose veins. In all such cases the positive sign of the involvement of the lymphatics is the discharge of lymph occurring spontaneously or withdrawn by the surgeon.

Treatment.—Treatment of all forms of lymphangiomata is a question rather of local measures than of internal medication. In those cases where there is a sufficient discharge of lymph to produce an anæmia, ferruginous and other tonics as well as liberal and nutritious diet are indicated.

When a lymphangiectasis depends upon some evident general condition, such as syphilis or tuberculosis, the administration of appropriate constitutional remedies will be required.

The local treatment of simple and cystic lymphangiomata frequently becomes a question of grave surgical procedures. For the various methods of dealing with these tumors the reader must be referred to works on general surgery.

For the cure of lymphangioma circumscriptum the only method which suggests itself is the destruction of the affected tissues. Where scarring is no objection, as on parts covered by clothing, the best method is by the thermocautery or the galvanocautery, as in this way not only are the tissues directly attacked destroyed, but sealing of the deeper lying vessels is produced. The whole thickness of the involved area should be destroyed, as there is always a tendency to the re-formation of the growth. Probably the reason that the chemical caustics are unsatisfactory lies in their superficial action.

Should the growth occupy only a very small area on the face or other region where scarring is disagreeable, ablation by the knife would probably give the best result. Here also the method by piercing each vesicle with a needle attached to the negative pole of a galvanic battery might be used. To be effectual, the needle must be kept in a sufficiently long time to produce coagulation of the contents not only of the vesicles but of the underlying lymph channels; a current derived from twenty cells of an ordinary fluid battery will suffice. Crocker (Diseases of the Skin, p. 504) tried this method in one of his cases, and a month afterward the result seemed satisfactory, but the outcome of the case he is not able to state.

In lymphangiectasis the dilated vessels may be supported by an elastic bandage, applied on the same general principles which govern its use in varicose veins. With the addition of properly applied compresses, lymphorrhagia may thus be controlled.

In favorable cases where only a few vessels are involved, and these superficially situated, they might be cut down upon and dissected out; or some method may be used to cause coagulation of the contents of the vessels, as was done by Beau, who introduced a thread into a small lymphangiectasis of the penis and thus produced inflammatory coagulation and cure. In the judgment of the writer, a preferable method of causing coagulation would be by electrolysis.

Whatever method is used, compression should be made above the site of the operation for some time afterward, to prevent any chance of the washing away of the clot.

Where chronic ulcerations and fistulæ of long standing are present, cure may be very difficult, or even impossible. Sometimes deep destruction with the more active chemical caustics has succeeded; thus cures have been reported by the use of chloride of zinc, and with Canquoin's paste.

In cases where the lymphangiectasis is a result of a tuberculosis of the lymph-vessels, all sinuses should as far as possible be followed up and laid open, and, after careful removal of diseased tissues, the whole surface of the wound should be thoroughly cauterized with zinc chloride or with the thermocautery.

In some cases the growth of the bones and soft tissues, the number of lymph fistulæ, and exhausting lymphorrhagia, will necessitate amputation.

Prognosis.—The prognosis in any case of lymphangioma must be guarded, for all the growths of this character have a tendency to increase in size at a more or less rapid rate. When operations are undertaken, unless the destruction of the growth be very thorough, redevelopment is apt to occur. This is as true of lymphangioma circumscriptum as of the other lymphangiomata.

With lymphangiectases the prognosis depends largely upon the cause of the dilatation of the lymph-vessels; if this can be removed, the lymphatic lesions may likely also be cured. The rarity of these cases makes deductions of a general nature in regard to prognosis almost impossible.

Whenever any operation is to be performed upon any of the affections which have been here considered, the strictest antiseptic precautions should be observed; for a study of the reported cases shows that septic infection of the lymphatic system very frequently results in the most disastrous manner.

RHINOSCLEROMA. (S. Pollitzer.)

Derivation: Gr., *ρις* or *ριν*, the nose; *σκληρός.*

Definition.—A chronic inflammatory affection characterized by the development of intensely hard, circumscribed, nodular growths in the skin and mucous membrane, most commonly of the naso-pharynx, due to inoculation with a specific bacillus.

Rhinoscleroma was first described by Hebra and Kaposi in 1870–'72, and hundreds of observations of the disease have been made since that time. The name selected by these authors is certainly appropriate in most cases, for in ninety-five per cent of all recorded, the affection was located partly or exclusively in the nose. But certainly, as Besnier has pointed out, the term *rhinoscleroma* is hardly appropriate when the affection is located in the pharynx, the larynx, the eye, or on the shoulder. Besnier has suggested the name *gleoscleroma*, but the name originally given has been universally adopted.

Symptomatology.—The disease begins as a rule in the nose, on the septum, or in one or both alæ. The patient's attention is perhaps first attracted by a feeling of resistance to the touch in the affected parts, or by a change in the shape of the nose. As the tumor develops the nose grows broader, flatter, and appears *retroussé.* To the touch, the tumors, which are generally flat and lobulated, offer a resistance which was compared by Hebra to that of ivory.

The new growth infiltrates the skin, and can be moved only with it; it is not, however, attached to the underlying fascia or bone or cartilage. Two cases, in which it appeared in the nose under the form of a hard polypus, have been recorded. The skin over the growth is either unaffected, or it is smooth and shining and devoid of follicles and hairs. Its color may be normal, or it may be pale, traversed by dilated blood-vessels, or it may have a dark, bluish-red tinge.

The tumor occasions *per se* absolutely no subjective symptoms, but firm pressure on it sometimes causes severe lasting pain. The tumor continues to grow steadily, and by its size ultimately may occasion considerable disturbance, producing stenosis, or, by encroaching on the tear-duct, dacryo-cystitis. When it is located on the velum palati, in the pharynx, the larynx, or the trachea, serious disturbances in deglutition or in phonation and respiration may be produced. Between the lobules of the growth fissures are apt to occur, which have but little tendency to heal, and occasion considerable inconvenience. Long-standing growths sometimes ulcerate, especially on mucous membranes. The growths have been found on the septum, the alæ, the turbinated, the tongue, the upper alveolar arch, the velum palati, the pharynx, the larynx, the trachea, the lips, the lachrymal sac, and the shoulder (Pawlow's case).

It is quite common in parts of Austria and Russia, where it appears to be almost endemic, and it is not infrequent in Brazil and Central America. Very few cases have been recorded in England and in Italy; not a single native case has been seen in France; a few scattered cases have been observed in other parts of the world—in India, Egypt, etc. I have observed one case of the disease in New York; and my friend Dr. Felix Cohn, who has had experience with the disease in Vienna, tells me he has had a case here in which the tumor was located in the velum palati. Dr. L. A. Dessar has given me notes of a case which he saw at the Mount Sinai Hospital Dispensary in a man of fifty years, in whom the growth began about five years ago; it affected the right ala nasi chiefly, and the right side of the naso-pharynx. In my case—which first came under my observation at the East Side Dispensary, in June, 1891, and was presented before the Dermatological Society by Dr. C. W. Allen, and later by Dr. G. T. Jackson—the tumor was located in the upper lip, just below the left ala, which was slightly tilted up by it; the tumor had grown very slowly, having been noticed about eight years before. All these cases were of foreign extraction, the patients being natives of Galicia (Austria), and the tumors had already appeared in the old country. The recent extensive influx of Russian immigrants has probably introduced many cases into this country.

Anatomy and Pathology.—On cutting into the tumor the knife meets with surprisingly little resistance—considering the great hardness, clinically, of the growth. This peculiarity is explained by the arrangement of the connective tissue into firm supporting bands, between the wide meshes of which the comparatively soft characteristic tissue is found. This consists of a dense accumulation of round cells, and scattered through them numerous large cells, which attain sometimes a diameter five or six times that of a white blood-corpuscle, from which there is reason to suppose they are developed. Two varieties of these cells—called Mikulics' cells—are described. The one, known as the hydropic or watery cell, contains a clear reticulated protoplasm; the other is filled with reticulated, highly refractive colloid matter. Either variety may contain one or more nuclei, and bacilli are found in both, but more numerously in the hydropic cells. The colloid matter, according to some authors, is simply the altered zoöglœa of the bacilli; according to others, the product of the reciprocal action of the bacilli and the protoplasm of the cell. The epidermis is generally quite normal, but down-growth of the rete pegs has been described. Widened lymph spaces occur just under the epidermis, as in tubercular leprosy.

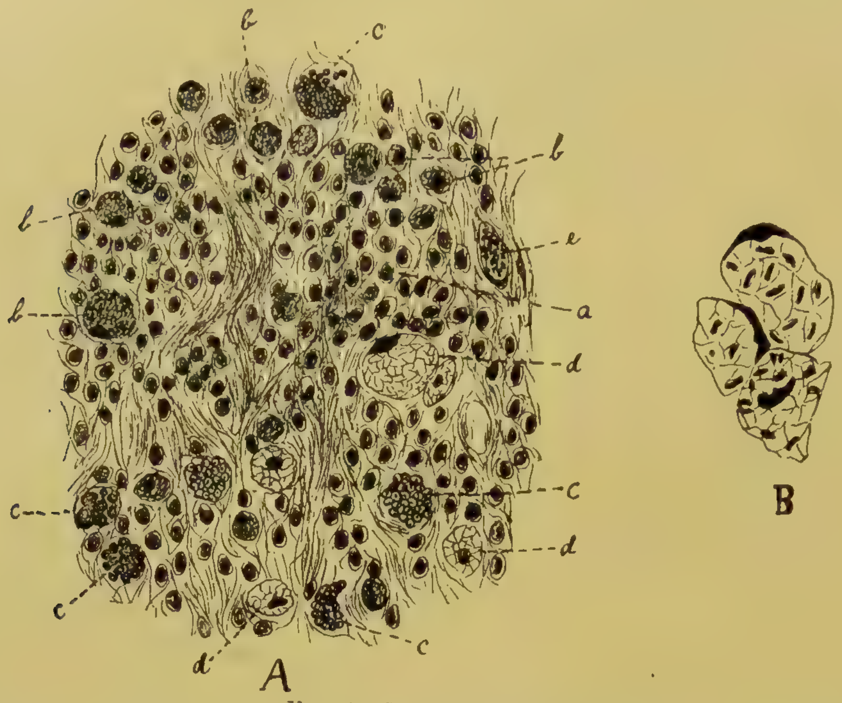


FIG. 37.—Rhinoscleroma.

A (after Noyes), *a*, ordinary infiltration cells; *b*, transition forms leading to *c*, colloid cells; *d*, hydropic cells; *e*, lymph spaces filled with bacilli. Magnified 670. *B* (after Mibelli), hydropic cells containing bacilli. Magnified 810.

Etiology.—The disease affects both sexes equally. No cases in infancy or old age have yet been noted. The successful inoculation experiments of Stepanow and Woulkowics would appear to establish the causative relation of the bacillus found in the tissues to the disease. The bacilli discovered by Frisch in 1884 are short and thick, with rounded ends, and inclosed in a capsule. They resemble Friedländer's pneumococcus very closely. They are best demonstrated by prolonged staining (twenty-four hours) in gentian-violet-aniline-water decolorizing by Gram. They are readily cultivated on the usual media, and inoculations into the anterior chamber of the rabbit's eye have been followed by growths having the structure of rhinoscleroma with typical Mikulics' cells.

Diagnosis.—The slow, painless growth, the ivory hardness, the predilection for the anterior nares, and the slight tendency to disintegration, are characteristics which make the diagnosis clear. In doubtful cases microscopic examination of an excised portion of the growth might be necessary. Syphilitic nodules, epithelioma, and sarcoma at the nasal orifice bear only a superficial resemblance to rhinoscleroma. The readiness with which they break down is an important point in their differentiation. Keloid may resemble it more closely, especially if the surface is crossed by dilated blood-vessels; but keloid is rare about the nose, its border is generally more irregular than that of rhinoscleroma, and we would expect a history of traumatism.

Prognosis.—The prognosis as to a cure is to judge from cases hitherto treated, almost hopeless. After excision the growths have always recurred *in loco.* The disease may continue indefinitely, however, without affecting the general health of the patient. The nutrition may, however, suffer if the growths interfere with mastication or deglutition. Lubliner has recorded a case of spontaneous disappearance of the growth after typhus, and Lutz one after typhoid, but the diagnosis in the latter case was doubtful.

Treatment.—Surgical measures, the knife, and the curette are practically the only treatment; but the prospect of a radical cure is, as we have said, almost hopeless. Lang appears to have had some success in one case by an energetic course of medication with salicylic acid internally and by injections into the tumor, but the patient passed from under observation before the cure was complete. For the relief of stenosis in the nose, the tumors may be drilled through. All operative wounds of the growths heal readily.

TUBERCULOSIS OF THE SKIN. (J. T. Bowen.)

INTRODUCTION.

No one doubts to-day that in tuberculosis we have to do with a chronic infectious disease caused by the action of a specific organism—the tubercle bacillus. The work of Koch and Baumgarten, together with the valuable contributions of other investigators, has demonstrated this truth so brilliantly and positively that no other belief in the domain of pathology can be regarded as more securely established. By aid of the great light thus thrown upon the morbid process, it has been proved that the skin is not exempted from the ravages of this bacillus, and that several forms of cutaneous lesions, that had hitherto been regarded as distinct affections, or of doubtful origin, are in reality but varieties of tuberculosis, when seated in the outer integument. Thus many cutaneous lesions characterized by a loss of substance, that had been previously passed over as doubtful, or called simple or chronic ulcer, have been proved to be entitled to a place under the heading of tuberculosis.

The diagnosis of "papilloma" is now made much less frequently than formerly by the expert, as it has been shown that in many of these cases a tuberculosis is the cause of the papillary hypertrophy and wartlike growths. Lupus, the best-known form of tuberculosis of the skin, has been the subject of much controversy, but at the present time the belief in its tuberculous nature is almost universal. For a long time searched for in vain, it was finally proved by Koch, Doutrelepont, and others, that the bacillus of tuberculosis, although very sparingly represented, could be demonstrated by a prolonged search in sections of lupus tissue, and further experiment showed that it could be cultivated in generations and produce tuberculosis by inoculation upon animals. The sole pathological proof that to the most skeptical could now be wanting was the production of lupus itself by inoculation; and although the clinical evidence that lupus may sometimes at least be caused by a direct inoculation of sputum or other material rich in tuberculous virus is increasing, it must be admitted that experiment has not as yet succeeded in producing this clinical form of tuberculosis upon the skin of animals. In consideration of the insusceptibility of the lower animals to many forms of human disease, it seems probable that the last lingering doubt will have to be dispelled by the overwhelming accumulation of clinical facts. The anatomist may fairly demand the aid of the clinician, and an intelligent judgment can only be formed by an impartial consideration of all the evidence.

Besides lupus there are three other forms that have offered substantial claim to be regarded as distinct varieties of cutaneous tuberculosis, namely, scrofuloderma, miliary tuberculosis or tuberculosis cutis, and the verrucous tuberculosis, tuberculosis verrucosa cutis. As will be shown later on, these are mere varieties of the process, and are to be regarded in the same light as the varied appearances produced by syphilis upon the skin, and as forms of a single disease. It would, indeed, tend to a better understanding of the subject if the names *scrofuloderma* and *lupus* were dropped entirely, and the clinical features that they represent were designated in some such way as are the various lesions in syphilis or leprosy; and it seems to be only a question of time when some more scientific and less misleading nomenclature will be adopted.

Without entering here upon the pathology of the affection, it should be emphasized that all these forms have repeatedly and by the best observers been shown to contain the bacillus of tuberculosis, and to possess a histological structure which coincides almost exactly with that found in tuberculosis of other parts. Throughout this article, therefore, the term *tuberculosis* will be used as including all these forms.

Symptomatology.—In the light of our present knowledge the clinical features of cutaneous tuberculosis may be considered in four parts:

1. Tuberculosis cutis. 2. Lupus. 3. Tuberculosis verrucosa. 4. Scrofuloderma.

I. TUBERCULOSIS CUTIS.

Synonyms: Ulcère des Phthisiques; Miliary Tuberculosis.

This form has been met with only in subjects affected with tuberculosis of internal organs, and is of rare occurrence. It has been called by the French *ulcère des phthisiques*—ulcer of the phthisical.

Chiari was one of the first to attract attention to this form of ulcer, which he found upon the cadaver, and he was soon followed by Jarisch with the report of a case where the probable diagnosis had been made *intra vitam.* The rarity of this form may be seen from the observations of Chiari, who examined seven thousand bodies (of which about sixty per cent were tuberculous) with reference to these lesions, with the result of finding them in five cases only, all on the lower lip. The situation of these lesions is almost exclusively at the juncture of the mucous membrane with the skin at the entrance to the mouth, nose, anus, and vagina; although Jarisch, Leloir, and Vallas report instances of their occurrence upon other parts of the skin.

They are shallow ulcers, rarely attaining a great size, with characteristic edges made up of a succession of small jagged indentations, caused by the degeneration of miliary tubercles, so that the lesion has an appearance as if gnawed out. The floor of the ulcer is not, as a rule, crusted, but covered with a sero-purulent fluid, and occasionally yellowish elevations, representing miliary nodules, may be seen scattered over its surface. At the periphery, also, these miliary nodules may sometimes be seen, and their presence is of course pathognomonic, although frequently they are absent. Their degeneration gives rise to small cup-shaped depressions or jagged indentations, when situated on the edges of the ulcer. This feature it is that distinguishes this form of tuberculous ulcer from other varieties, and places it in the same class with the miliary tuberculosis of the internal organs, and with the tuberculous ulcers that have been for a long time recognized upon the tongue. In fact, as pointed out by Thibierge, a description of the tuberculous ulcer of the tongue would be almost identical with that of this form of tuberculosis of the mucous orifices. These ulcers are usually quite painful, as distinguished from other forms of cutaneous tuberculosis—a feature that may, it is true, be owing in great measure to their situation at the juncture of mucous membrane and skin, at a point where all lesions are more keenly felt on account of the constant irritation from the secretions.

The course of these ulcers varies. Sometimes they extend and enlarge steadily, at other times their increase is very slow and chronic; and as a rule they are important only from the annoyance and discomfort they cause, and have not progressed to a great extent when the patient succumbs to the tuberculous pulmonary or intestinal affection. They are usually single, but may be multiple, as cases have been reported where several different portions of the body were affected by the ulcers. At the same time their association, when on the lips, with tuberculosis of the lungs, and when on the anus with tuberculosis of the intestines, points to the conclusion that these lesions are caused by auto-inoculation from the sputum and from the intestinal discharges. Often, too, they are associated with tuberculous lesions of the mucous membranes.

In cases where the ulcers are situated upon the glans penis they have been shown to be consecutive to a tuberculosis of the urinary passages, and those on the vulva have apparently followed a tuberculosis of the uterus or tubes. It is not only in the more advanced stages of tuberculous disease, and when the patient has become exhausted, that these ulcers make their appearance. They may be seen when pulmonary or other symptoms are quite slight, or even when no signs are apparent. It is not improbable that a very large proportion of these cases are not recognized, as the affection is often so trifling in comparison with the constitutional troubles that but little attention is paid to it. Still, the statistics of Chiari, just referred to, prove that the form is a rare one.

Since attention has been directed to the subject of the various forms of cutaneous tuberculosis, a considerable number of observations have been recorded where ulcerations developed at the point at which a wound had been received, and in many of these cases there followed a secondary infection of the glandular system and of the internal organs. In some of these instances the ulcer is described as of the type of tuberculosis under discussion, in others the descriptions are not sufficiently clear to justify us in placing it under any of the clinical headings recognized to-day. In many instances the appearances suggest a transitional form between tuberculosis cutis and lupus, as in several cases lately published by Doutrelepont.

Of late years many cases of infection with tuberculosis have been recorded which resulted from the practice of sucking the wound in the Jewish rite of circumcision, by the operator. This practice has been abandoned in France, on account of the transmission of syphilis by operators who were affected with mucous patches in the mouth; but in other countries where the method is still in vogue it has been found that tuberculosis also may be transmitted if the operator is affected with this disease. In these cases an ulcer forms at the site of the wound, which is often followed by tuberculous infiltration of the inguinal glands, and unless they are promptly treated tuberculosis makes its appearance in various tissues, including the lungs and meninges, and the infant rapidly succumbs. These cases often progress very rapidly to a fatal conclusion, owing in all probability to the extreme youth of the subject. Perhaps the most interesting example of tuberculosis from ritual circumcision has been presented by Lehmann, who relates an instance where ten children were infected from the same operator, and in three of these a rapidly fatal issue from marasmus is recorded.

These cases of tuberculous ulceration from the infection of wounds have not, as has been said, been thoroughly studied or classified, and it is by no means improbable that longer experience will bring to light other clinical forms. At present, however, they are included in the ulcerative form of tuberculosis, as they approach more nearly to this type than to those yet to be described.

II. LUPUS VULGARIS.

The characteristic and primary feature of lupus is a reddish-brown nodule, becoming paler but not disappearing on pressure, of soft consistency when pressed upon by a blunt-pointed instrument, situated beneath the epidermal layers in the tissues of the corium. This nodule or tubercle—*lupoma*, as it has been called—is variable in size, has a slow, chronic course, and, from its changes by development or involution, gives rise to the varied appearances that are to be seen in the different forms of lupus. These nodules, the primary feature of lupus, are constantly appearing during the course of the affection, and are the first signs that present themselves in the event of a recurrence. The softness of these nodules is an important point of differentiation from syphilis and leprosy. They are not painful. Leloir affirms that the tactile sensibility is usually diminished, and that there is a local elevation of temperature at the site of the separate nodules. They are usually barely perceptible to the touch when the skin is put upon the stretch, and are not in this case elevated above the skin surface. To this stage in the evolution of the nodule the name **lupus maculosus** has been given by some writers, and the disease may run its course without any change from this type.

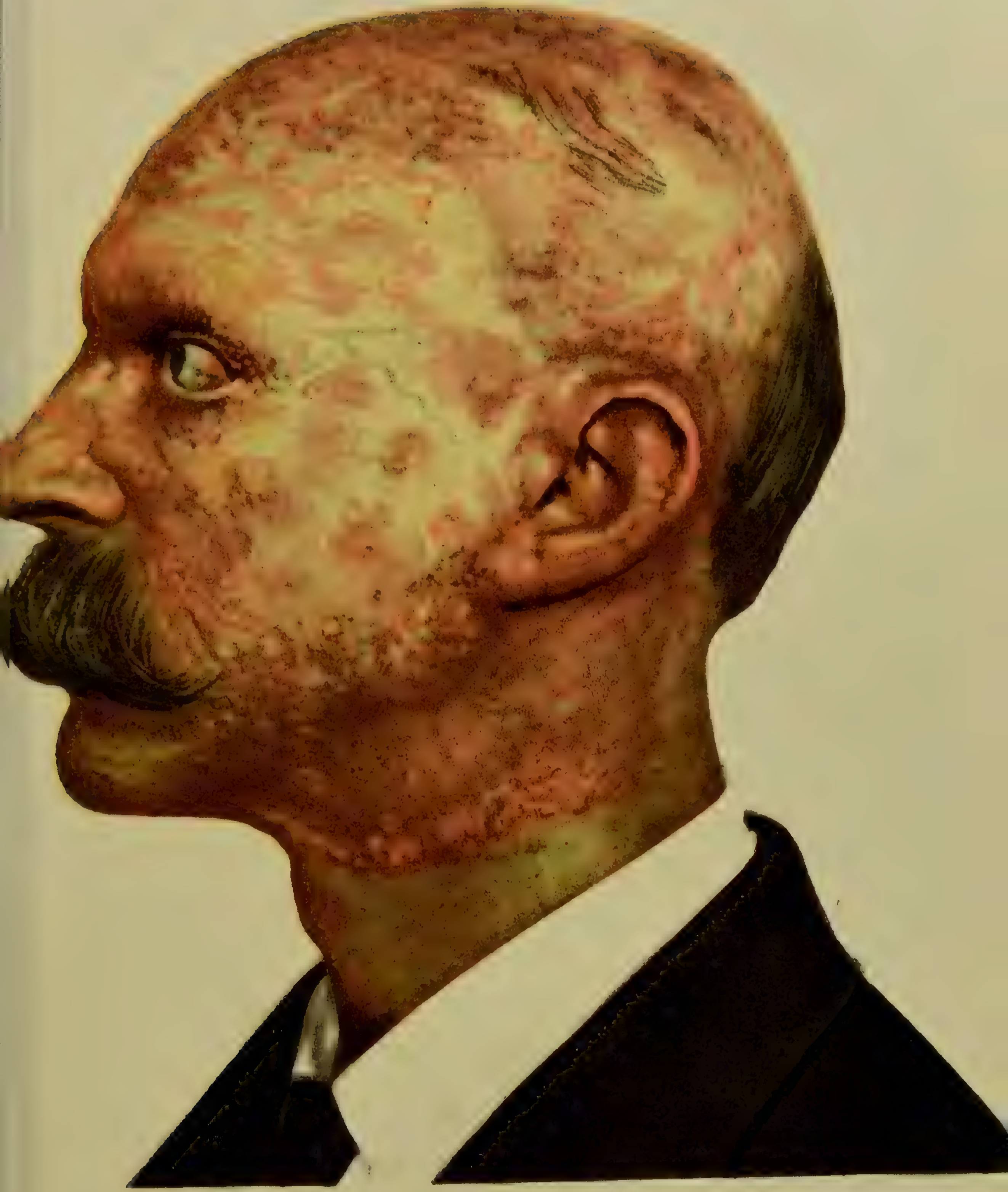
Frequently, however, there now begins a period of development in the single lupus nodules, and to the various clinical forms thus produced a vast number of different names have been given—names for the most part useless and cumbersome. The single nodules may increase in size slowly, and papular elevations that are quite apparent to the touch may be formed—**lupus élevé.** A number of contiguous nodules may, by their increase, coalesce so as to form more or less extensive raised areas of disease—**lupus tumidus.** These plaques pursue a sluggish course and rarely ulcerate. Sooner or later a process of involution begins to show itself. Sometimes the separate nodules gradually sink in and disappear by absorption, while the overlying epidermis, that has been previously tense and glistening, becomes puckered up and scaling—a condition to which the name **lupus exfoliativus** has been applied. When the process of absorption has been completed, the tuberculous infiltration is replaced by a cicatricial depression.

An important clinical variety of lupus is determined by the *arrangement* of the different nodules. Instead of being scattered about irregularly, the lupus nodules may arrange themselves at the periphery of an existing patch, and the central portions undergoing absorption, while new elements are continually cropping out at the border, a serpiginous arrangement is produced—**lupus serpiginosus.** This is a formidable variety, on account of its long duration, its resistance to treatment, and the great deformity that it produces when unchecked in its course. It occurs on the extremities as well as on the face.

Instead of being absorbed, the tuberculous neoplasm may, after reaching a certain stage of development, undergo a process of necrobiosis, which causes a softening and breaking down of the nodules, so that an ulcer is the result—**lupus exulcerans.** These ulcers when superficial are covered with crusts, which are made up of the product of retrograde metamorphosis of the tuberculous tissue—a cheesy material—and of the products of a secondary septic infection, sero-purulent liquid and pus cells. It is in great measure owing to the varying extent of the septic complication that the different clinical appearances assumed by these crusts are due. It is very easy to mistake a lupus, when the ulceration is covered with crusts, for a simple impetiginous eczema, or for an impetigo, the result of the action of the septic micrococci on the skin. The lupus ulcer when freed from its crust presents the aspect of a more or less rounded loss of substance, with soft, reddish borders, a red or grayish floor covered as a rule with granulations, slightly or not at all painful or sensitive to pressure. The important characteristic of this ulcer, as well as of all tuberculous tissue, is its soft consistency, allowing the entrance of a blunt instrument very readily, and contrasting sharply in this regard with other affections, as syphilis and epithelioma, with which it may be confounded. The secretions of the ulcer are found by the microscope to consist of granular detritus or pus cells, but it is very rarely that tubercle bacilli can be found. The micro-organisms of suppuration are, on the contrary, present in large numbers.

Sometimes it happens that the lupus ulcer by a perversity of growth, takes on a vegetative, exuberant character, and large papillary fungoid masses are developed from its surface—**lupus papillaris verrucosus.** The most remarkable features of this form are seen when it is situated on the nose, which may be in appearance enormously hypertrophied and converted into a shapeless fungous mass. When the diseased tissue has

PLATE XVI.



Lupus Vulgaris (Robinson).

been removed by degeneration or by surgical interference, the nose will be found to be in reality very much diminished in size, reduced oftentimes to a mere stump.

Various names have been given to the ulcerating form of lupus, according to the depth to which the tissues are affected. Thus, when the ulceration progresses both superficially and deeply, it has been called **lupus vorax,** while the acute fulminating form, which may in several months or weeks extend over large portions of the body, is named **lupus phagédénique.** This latter variety is rare, and is not improbably the result of some secondary infection added to a pre-existing tuberculosis.

When the lupus extends downward it often follows the lymph spaces, and the tracks of the vessels and glandular structures. In this way the subcutaneous connective tissues, muscles, cartilage, and bone may be affected and destroyed, cartilage especially exhibiting a very feeble resistance to the advance of the lupous process.

The manifestations of lupus are so varied and so dependent upon the anatomical structures in its vicinity that it is necessary, having considered the process in general, to describe the particular features that it presents in the different localities.

Lupus of the Face.—The face is by far the most frequent seat of lupus, and here almost all the various forms are met with. Above all, the nose is attacked with great frequency, the lupous nodules appearing on the skin of the alæ and extending gradually over the whole organ. Oftentimes, however, the source of the affection may be the mucous membrane of the nose, and after a longer or shorter period, during which there is an obstinate crusting of the nostril, the lupus may appear upon the outer skin, and the process for the first time receive recognition. In its destructive course the disease attacks with great avidity the cartilaginous septum, and in the course of time the whole lower portion of the nose may be consumed, giving it an appearance as if hacked off. On the other hand, lupus rarely attacks the bony parts of the nose, Kaposi declaring that he has never seen them destroyed. This is a point of importance in distinction from syphilis, which attacks the bony skeleton of the nose quite readily, giving rise to the sunken, "caved-in" appearance so characteristic of this disease, and so different from the "lopped-off" appearance of the lupous nose. It should be remembered, however, that the nose may at first be very much increased in size from the accumulation of crusts, and from the papillary outgrowths so frequent in this region, but that removal of the dead tissues will show that in reality a large part of the organ has been destroyed.

Lupus of the Cheeks, lips, and ears is also frequent, and at times the whole face may be invaded (Fig. 38). The ears may be affected either primarily or secondarily, and are oftentimes enormously enlarged from the tuberculous infiltration and fungous elevations. The external auditory canal and membrana tympani may be affected, and an otitis media with perforation of the membrane may result. Lupus of the forehead and of the scalp is rarely primary; it usually results from the extension of neighboring foci. Lupus of the scalp has been observed in a few rare instances by Hebra and Kaposi, and once only by Leloir. When the whole face is affected, the most frightful disfigurement may be produced; the nose reduced to a stump, with small apertures for the nostrils; the mouth contracted by cicatrization, so that only a knitting-needle can be passed into it; the ears completely destroyed, or covered with a thin cicatricial membrane; the skin everywhere reduced to a cicatrix stretched tightly over the bones, with here and there a fresh point of disease displaying itself. Such is the picture that may be met with in the most advanced cases.

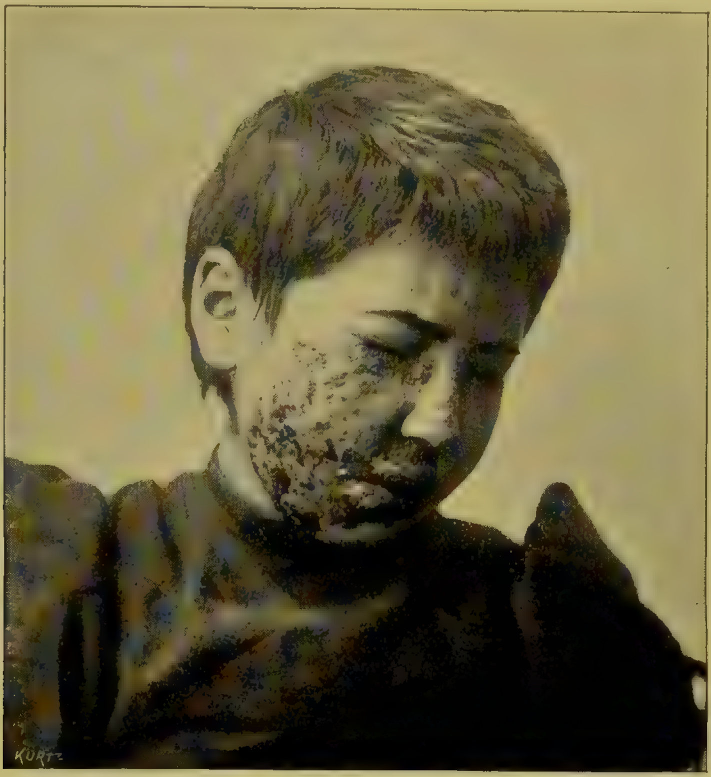


Fig. 38.—Lupus of face.

Lupus of the Extremities.—The extremities are common seats of lupus, the affection appearing on the upper and lower limbs next in frequency to the face. The greatest intensity of the process is observed from the elbows downward on the upper extremities and from the knee downward on the lower (Fig. 39). A feature of lupus in this situation is that it more frequently pursues a serpiginous course than when in other places, although it may be in isolated patches here. The lupus frequently makes its *début* at the points of articulation, upon the hands and feet, and may extend to the deeper structures, causing necrosis, and great deformity of the fingers and toes. It is very exceptional for a lupus to begin upon the palms and soles, and Leloir has seen but two cases which began upon the palms, none upon the soles (Fig. 40).

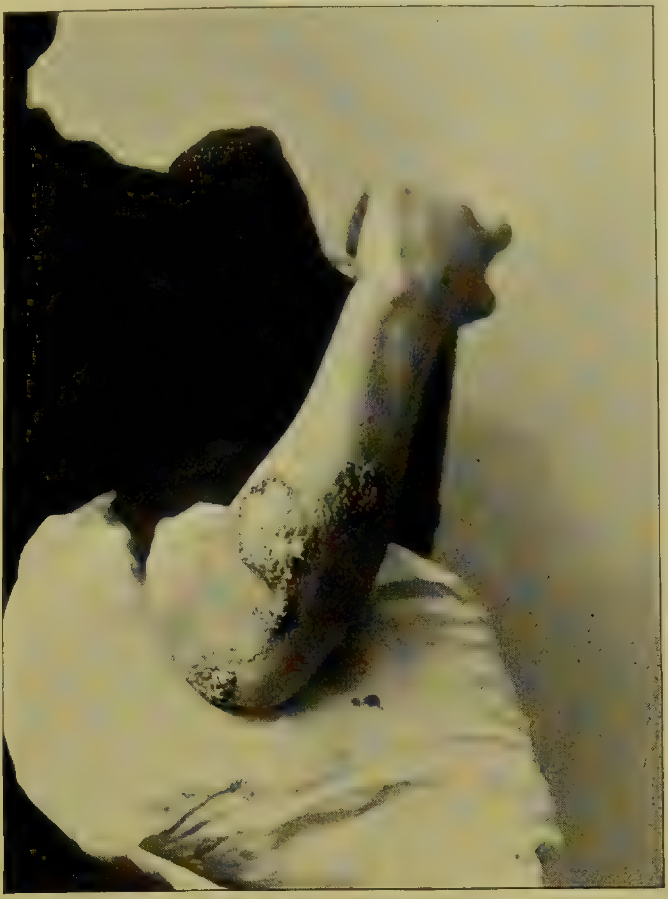


FIG. 39.—Lupus of arm. Same subject as Fig. 1.

One of the chief characteristics of lupus of the extremities is the great deformity that may be produced in the course of time. These deformities and mutilations are not seen in the very young, and it has been said that they never appear before the twelfth year. When the malady is seated in the integument over the joints, it may, if extended over a large surface, be followed by cicatrices that limit the free movement of the articular surfaces, and thus cause pseudo-anchylosis of the knees, elbows, and fingers. The deformity is further increased by the tuberculous process boring into the deeper tissues, involving the fascia, tendons, periosteum, and bone, and causing abscesses, fistulæ, caries, and necrosis. In this way portions of fingers or entire fingers may become necrotic and be totally destroyed, and this result, added to the contractions of the cicatricial tissues may produce the most terrible deformities, the fingers being twisted, thickened, distorted, or wanting, presenting appearances that have often been confounded with those of *lepra mutilans.*

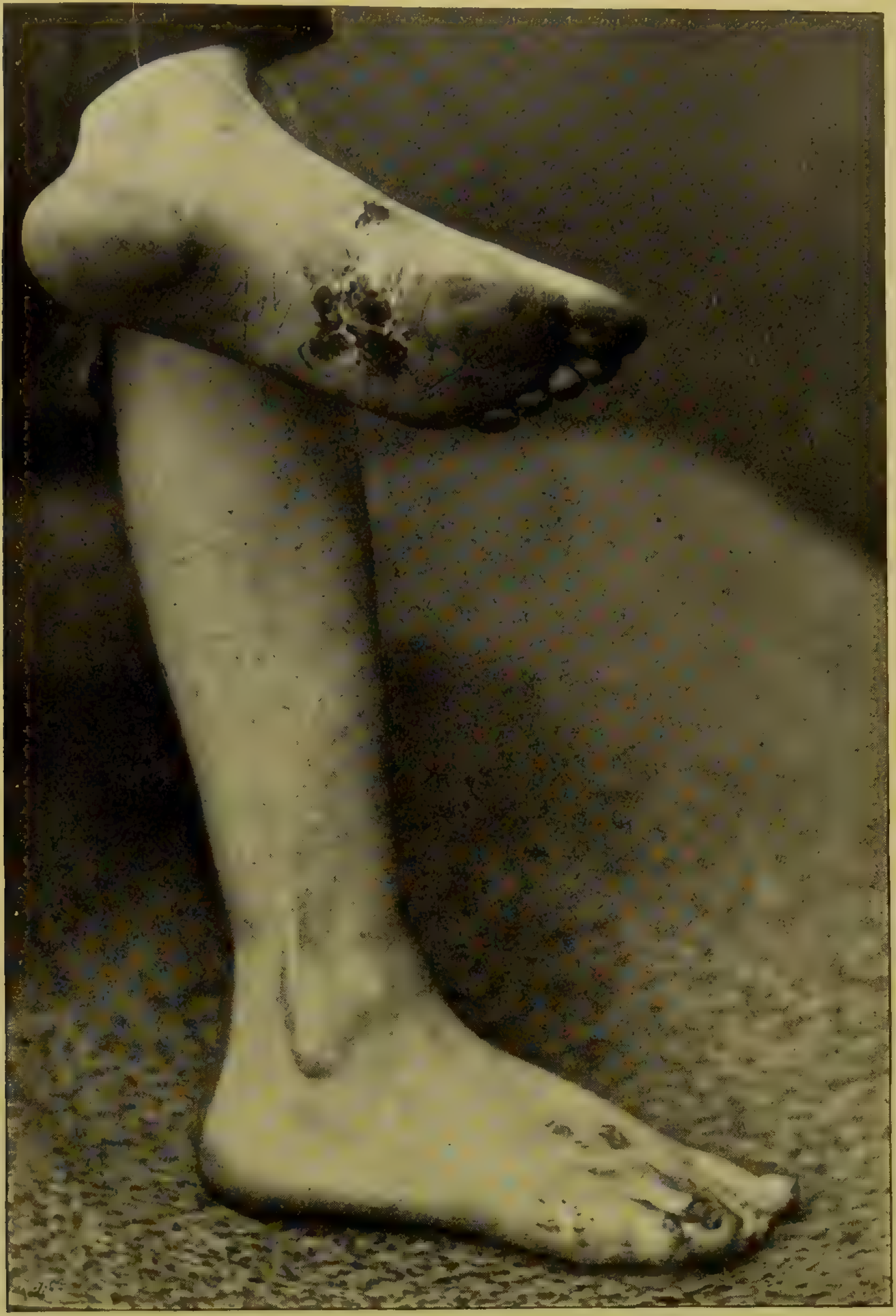


FIG. 40.—Tuberculous lesions of feet. Same subject as Figs. 1 and 2.

To the deformities resulting from the cicatricial contractions, from the fistulæ, the caries, and necrosis, we have to add another that may be developing at the same time—a thickening and engorgement of the skin, which finally ends in a condition of elephantiasis. This state is brought about by the obstruction to the circulation caused by frequently recurring attacks of lymphangitis and dermatitis, and by the venous and lymphatic stasis resulting from the contraction caused by the cicatrices. A state of chronic œdema is thus produced, and the successive outbreaks of lymphangitis leave the tissues more and more œdematous, just as in elephantiasis arabum. Gradually there follows a new formation of connective tissue, the skin, subcutaneous tissue, periosteum, and bones become thickened and hypertrophied, and the leg or arm in its entirety is greatly enlarged, deformed, and partially immovable. This state of elephantiasis, as a result of lupus, is more commonly seen on the lower extremities, although an occasional example of its occurrence on the arm is met with. The surface of the skin is usually rough and papillomatous, in places raised up into thick ridges with deep intervening fissures, or covered with fungous elevations and rough crusts. In other places are deep tuberculous or scrofulous ulcers, which, as will be insisted on later, often accompany a lupus vulgaris, and are to be regarded simply as a deep tuberculosis. Over these greatly hypertrophied legs or arms there commonly appear fresh eruptions of lupus, during a period of many years. When the leg is the part affected the elephantiasis proceeds upward from the foot, rarely extending above the knee. This is one of the most serious complications of tuberculosis of the outer integument, owing not alone to the great deformity and to the uselessness of the limb affected, but also to the fact that the successive attacks of lymphangitis tend to disseminate the disease, and to set up tuberculous foci in the lymphatic trunks and in the glands.

Lupus of the Genitalia.—Lupus is rarely met with on the genital organs. Hebra had seen but one case on the penis. Lupus of the vulva is rare in the experience of the best observers, and Taylor and others have shown that a large proportion of the lesions loosely classed as lupus have a different etiology.

Lupus of the Mucous Membranes.—The mucous membranes that are adjacent to a lupous patch are not infrequently also affected by the same disease. Leloir's statistics show that out of a total of three hundred and twelve cases of lupus the mucous membranes were involved a hundred and nine times. The mucous membranes are most commonly invaded secondarily to the skin, yet primary lupus of the nose is of far more frequent occurrence than was formerly supposed, and late observations have tended to show that lupus in this situation may often escape notice or be mistaken for an eczema of the nostrils. Neisser has even gone so far as to conclude that lupus of the face is generally caused by the extension of the process from the adjoining mucous tracts, and especially from those of the nose.

Lupus of the mucous membranes offers more difficulty to the diagnostician than does lupus of the skin. The characteristics so clearly brought out upon the skin are largely wanting on the mucous membranes, owing to the thin epithelial covering, which offers little resistance to the lupous infiltration, and to the constant maceration of the parts by the secretions. The lupous nodules, which on the skin are pathognomonic of lupus, are not, as a rule, to be seen on the mucous membranes. They are replaced, according to Chiari and Riehl, by papillary excrescences, which are to be looked upon as the primary lesions of lupus in this situation. These excrescences form by their confluence plaques of irregular shape, upon which the epithelium is in part intact, in part thinned or wanting. The lupous infiltrations may disappear by absorption, or the separate nodules and plaques may break down, forming slowly progressive ulcers of varying depths. Some of the nodules do not coalesce to form plaques, but appear as scattered individual lesions and so remain.

The diagnosis of these lupous ulcers is by no means always easy, and oftentimes the coexistence of lupus of the outer integument has alone rendered their nature clear. As regards the tuberculous ulcers of the mucous membrane that may accompany an internal or general tuberculosis, their differentiation from lupus may be a matter of the greatest difficulty; but that is to be expected, since we now consider them both forms of tuberculous disease. In short, it seems useless to attempt to separate them clinically.

A much more important point is the differentiation of these lupous ulcers from syphilis. A study of the course is an important aid to diagnosis, as the lupous infiltrations may be observed, if continually watched, to disappear by absorption in some instances, in others to break down and form ulcers, and the analogy with lupus of the skin is thus made evident. The ulceration is more likely to affect the larger plaques and infiltrations. Chiari and Riehl point out that a pathognomonic sign is the appearance of the primary manifestations in the cicatrices—not in this case in the form of papillary excrescences, but as brown-red nodules, not perceptible to the touch, imbedded in the scar-tissue, and identical with the lupous nodules so characteristic of the skin lesions. In no other disease do these recurrences appear in the cicatrices.

Upon the conjunctival mucous membrane lupus may occur as a primary manifestation, but is usually secondary. It appears as grayish or reddish soft nodular masses, like granulations, seated upon the mucous membrane, which is greatly injected. It develops first on the lower lid, as a rule, and is generally unilateral. The lids may be partially or totally destroyed by the lupus. The bulbar conjunctiva and the cornea may also be invaded, so that total loss of vision may result.

Upon the mucous membrane of the mouth and pharynx, lupus when present usually coexists with that of the skin. I have seen lupus develop several times upon the gums, consecutively to lupus of the nose and cheeks; and in these instances the gums were swollen, softened, easily bleeding, and covered with uneven, granulationlike elevations. In one instance almost the entire extent of the gum upon both upper and lower jaws was thus affected. Leloir has seen the vault of the palate perforated by lupus in exceptional instances, contrary to the experience of Hebra and Kaposi. In any event it is a rare occurrence.

Lupus of the tongue is rare. I have seen one instance of extensive and old lupus of the face, with implication of the gums and soft palate, where the central portion of the dorsum of the tongue was occupied by a moderately deep ulcer, pursuing a very chronic course, its floor composed of uneven exuberant granulations, covered with a grayish exudation, sensitive and very rebellious to treatment, with soft and slightly raised edges. In most of the reported cases the lupus was of the non-ulcerating variety, made up of tubercles of varying size, of a sclerous consistency, as in the case of Leloir.

Lupus of the larynx is another rare localization occurring in two per cent of the cases of Leloir. The primary form is exceedingly rare, only a few instances having been reported. Secondary lupus of the larynx may arise from the extension of a lesion of the pharynx or nasal cavity, or may appear associated with tuberculous lesions of the outer integument. Its course is slow, the symptoms consisting of increasing hoarseness, followed sometimes by complete aphonia. According to Chiari and Riehl, the affection begins by the appearance of small papillary excrescences, either singly or in groups, which in the course of time become absorbed or break down, as do the nodules of the skin, so as to form round or irregular ulcers, with flat edges and floor covered with purulent secretion. Recurrences may occur in the cicatrices, as in lupus of other parts.

Laryngeal lupus is almost always found upon the epiglottis, the latter being unaffected in only three of thirty-eight cases of Chiari and Riehl. The more dangerous complications, such as perichondritis, chondritis, necrosis, and œdema of the larynx, are rarely seen. Attempts have been made to differentiate lupus of the larynx from the tuberculous ulcers associated with tuberculosis of the lungs and internal organs, on the ground that the lupous ulcer may heal with the formation of cicatrices, in which lupous nodules appear, and that the yellow or white miliary nodules which are found at the periphery of the tuberculous ulcer are not seen in lupus. But these points of distinction have less force when, as at present, we regard both processes as etiologically the same; and the variations in form may be explained as due probably to the greater or less acuteness of their course, so that there must be many transitional forms where a differential diagnosis is impossible.

In a word, as Michelson and Leloir have insisted, lupus of the mucous membranes is frequently difficult to distinguish from other varieties of tuberculosis in this situation, and but little stress can with truth be laid on the differential characteristics. Lupus of the skin presents certain features that justify its provisional separation from the tuberculosis cutis, and from warty tuberculosis; and while in some instances the same clinical distinctions may be found on the mucous membranes, there seems little or no ground at the present time for a division into special forms.

III. TUBERCULOSIS VERRUCOSA.

An affection of the hands and fingers of persons working in dissecting and autopsy rooms, ward tenders, etc., has long been recognized under the name of *verruca necrogenica*—anatomical wart or tubercle. To the French writers, notably Besnier and Vidal, belongs the credit of first directing attention to the fact that it occurred often on the hands of persons who had made autopsies on consumptive subjects, and of pointing out its resemblance to some forms of lupus. During the years 1884–1885 tubercle bacilli were found in these lesions, and in 1886 Riehl and Paltauf described a new form of skin tuberculosis, under the name of *tuberculosis verrucosa cutis*, which they declared to bear a close relationship to the verruca necrogenica. These warty lesions were found to occur upon the hands of butchers, cooks, and those having to do with animals or animal products ; and the subjects were, as a rule, in good physical condition.

In the most typical lesions, those that are identical in appearance with the verruca necrogenica, there are quite marked inflammatory appearances. The outer edge of an increasing plaque shows a broad erythematous band, the next zone toward the center is composed of a row of small pustules, while the center itself is occupied by a warty outgrowth covered with crusts and horny epidermis, with erosions and pustules between the papillary excrescences, from which a purulent fluid may be pressed. The bacillus of tuberculosis was found in these lesions, and later experiments have shown that by inoculation upon animals it will produce a true tuberculosis.

The original description of Riehl and Paltauf has since been somewhat enlarged, and there is found to be a great diversity in the appearances that this form may present. The plaques may be small or large, often covering the whole back of the hand, and the inflammatory appearances may be entirely wanting, the lesion appearing as a tubercle of soft consistency, which may at a given time present but little, if any, warty change upon its surface. A marked tendency to papillary hypertrophy is, however, a characteristic of this form. There is little tendency to ulceration, but the affection may at times disappear by absorption, the center becoming cicatrized. In children it may occur on the backs of the hands, elbows, and knees, as in the cases described long ago by McCall Anderson as *lupus verrucosus*, or *scrofuloderma verrucosum*, and in these cases it often coexists with tuberculosis of other tissues, as I have several times observed.

From the frequency with which a direct contact with tuberculous tissue can be demonstrated, this verrucous form has come to be considered as the usual manifestation of a direct inoculation of tuberculosis upon the skin, its clinical appearances being probably determined by the structure of the skin at the favorite seats of its appearance, which are notably, as has been said, the backs of the hands and fingers, elbows and knees (Fig. 41). In several instances I have seen the affection on the hands of men who had charge of cattle on transatlantic steamships, and the frequency of its occurrence upon people who have been for months caring for a phthisical relative or friend will be spoken of under Etiology.

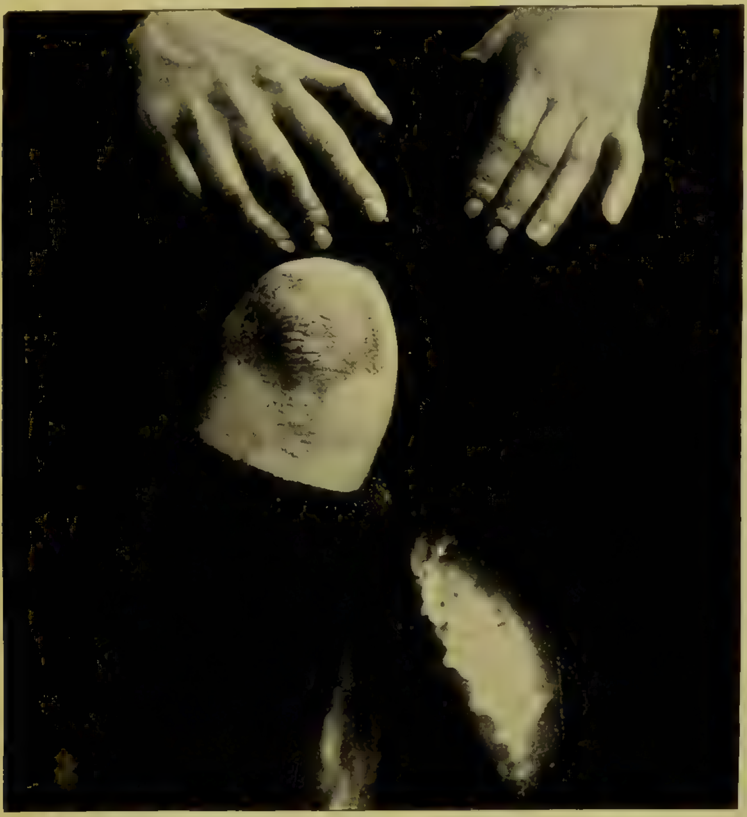


FIG. 41.—Verrucous tuberculosis in a subject also affected with pulmonary tuberculosis.

The course of the verrucous tuberculosis is exceedingly chronic, the lesions in some instances lasting for many years without undergoing any alteration, if left to themselves. In some instances it undergoes spontaneous involution, and it is not, as a rule, followed by serious consequences. Instances of its unfavorable course and of the subsequent infection of the vital organs are, however, on record, and it is not improbable that statistics that are yet to be collected will show that serious after-results are more frequent than has been supposed. After remaining quiescent for a long period, the affection may be propagated through the lymph channels, and subcutaneous nodules may appear in the course of the lymph vessels or in the lymph glands, which break down to form the so-called scrofulous ulcers. The tuberculous affection may extend to the deeper structures, and finally the internal organs may become affected, and the patient may die from tuberculosis of the lungs.

IV. SCROFULODERMA.

Tuberculosis of the Subcutaneous Tissue.—By the term *scrofuloderma* we understand a tuberculosis having its starting point and principal seat in the subcutaneous connective tissue, and involving the skin only secondarily and by extension. These lesions may arise either primarily in the subcutaneous tissue, or they may appear consecutively to softening lymph glands. At other times they arise as perilymphangitic nodules. These lesions appear as moderately soft, circumscribed infiltrations, over which the skin is at first freely movable, are unaccompanied by pain and tenderness, and pursue usually a chronic course. Later, the nodular infiltration gradually becomes softer, the skin is involved by the growth of the process upward, and appears hyperæmic, thinned, and of a bluish tint. Finally, the cutaneous covering of the lesions is broken through, and the semiliquid contents, consisting of necrotic and cheesy degenerated tissue, mingled with serum and small round cells, are evacuated. In this way the scrofulous ulcer is formed.

The form and extent of these tuberculous ulcers vary greatly. If the infiltration was seated in the subcutaneous tissues immediately below the skin, a superficial, more or less extensive ulcer is produced, with soft, reddish-blue edges, somewhat undermined. If, however, the infiltration proceeded from degenerated lymph glands, a deeper ulcer is the result, into which fistulous tracts and openings enter which may extend to the cartilage or bone. It usually happens that the surface of the ulcer is larger than the original point of opening, so that the edges are undermined, sometimes for a considerable distance. There may be several openings, connected by thin bridges of bluish skin. The floor of these ulcers is usually uneven, made up of soft, pale granulations, which bleed very easily and are covered with yellowish pus.

The course of the scrofulous ulcer is always slow. Absorption of the tuberculous infiltration before softening and opening have taken place belongs to the exceptions. The formation of a fibrous capsule which shuts off the tuberculous tissue, causing the process to become stationary, may occur. Usually, the tuberculous infiltration breaks through the skin, and the resulting ulcer pursues a slow, chronic course, becoming gradually larger from the breaking down of the soft, undermined edges. If an acute inflammation intervenes, the tuberculous tissue may in some instances be eliminated, and the edges gradually becoming fused with the granulating floor, healing with cicatrices may be accomplished. These cicatrices may assume a variety of forms, but there is nothing distinctive in their appearance, except perhaps their irregularity. They are often disposed in irregular, thickened bands with a netlike arrangement, between which islands of sound skin are visible.

Pathology and Morbid Anatomy.—As the histological appearances of cutaneous tuberculosis in its various forms are in their essential elements the same, a brief *résumé* of the features common to all may properly be presented before entering upon a description of the several divergences. In all instances of tuberculosis we find the tubercle, the product of the tubercle bacillus—a nodule of so-called granulation tissue, composed histologically of small round cells, deeply stained by coloring agents, together with larger cells possessing a clear nucleus, that have been called epithelioid cells, and large cellular elements with peripherally arranged nuclei and homogeneous center, the Langhans giant cells. These cells are inclosed between the meshes of connective tissue, and are characterized in distinction from normal cells by their *instability*. Sooner or later a modification begins in the nodule. Its center becomes necrotic—i. e., the cell protoplasm is coagulated, the nuclei lose their power of responding to staining agents, the intercellular substance also takes part in the degeneration, and there results a coagulation necrosis in the Weigert sense—a condition that has been called a cheesy degeneration.

It has been claimed, at various periods in the history of tuberculosis, that both the cheesy degeneration and the Langhans giant cells were pathognomonic of the affection. Neither of them can now be considered a special attribute, inasmuch as cheesy degeneration is found in numerous other conditions, and as the Langhans giant cell, while still retaining an especial association with tuberculosis, can frequently be seen in its typical form in the tissues about vessel ligatures, and in several forms of syphilis —notably in gummata and in the small papular or lichenoid variety. While it may be said that the course or *life* history of the tubercle, together with its tendency to progress in the adjacent tissue, are to some degree specific, the sole feature that we have practically to regard as pathognomonic is the presence of the tubercle bacillus, and these bacilli have been shown to be constantly present, although often sparingly, in all forms of cutaneous tuberculosis.

Tuberculosis Cutis.—These lesions have not, so far as my knowledge extends, been studied in the light of the modern histological methods; but all pathological examinations that have been made tend to prove the similarity of their structure to that of the miliary tuberculosis of the internal organs. The cutis is found under the microscope to be filled to a considerable depth with circumscribed deposits or foci of small round cells, with occasional epithelioid and Langhans giant cells. In the center of these foci the necrosis has progressed rapidly, so that upon microscopical examination the appearances of softening and cheesy degeneration are apparent. The tubercles often by their coalition form masses of softened and necrotic tissue, in which the evidences of unaltered granulation tissue can only be found in the outlying parts. In places the epidermis has been broken through by the tuberculous infiltration, leaving an ulcerated surface.

In the number of tubercle bacilli found in this form there is, I am convinced, a further analogy with the miliary tubercle of the internal organs. In the cases that I have examined they were present in large numbers; in one, every field contained enormous masses, and this accords with the experience of Riehl, Doutrelepont, and others. This form has often been classed as a true tuberculosis of the skin, and offered as a powerful argument against the tuberculous nature of lupus, on the ground that the bacteriological and histological features of lupus differ in many respects from this miliary form. That this form presents characteristics not seen as a rule in lupus is freely admitted; but the differences are just those that distinguish an acute from a more slowly progressive tuberculosis of other parts. The process in this form runs a more rapid course. The cells are speedily transformed into masses of necrosis of a cheesy consistency, and the cause of this accelerated degeneration lies in the great number of tubercle bacilli—phenomena that have been shown to be the rule in acute tuberculosis of other tissues.

Lupus.—In lupus we have a tuberculous affection, having its starting point in the corium, affecting primarily the lower portions, progressing upward by extension of the foci of disease, and causing in most instances secondary and nonspecific alterations of the epithelial elements. Before the discovery of the tubercle bacillus, histological investigation had already pointed out with much clearness the resemblance existing between the anatomical features of lupus and tuberculosis. Friedländer contributed more than all others to a correct appreciation of this similarity, and argued that the points of difference were not distinctly enough defined to separate the two affections. For example, the suppuration, which was claimed to be an especial attribute of lupus, is no more than the breaking down and softening of the granulation tissue. A true suppuration often occurs, but only when a septic process is ingrafted on the tuberculous tissue. With regard to the other points of difference that have been advanced, they are precisely those that characterize a rapidly progressive from a chronic and less virulent process. "Cheesy degeneration," the synonym for an advanced necrobiosis, is not seen in lupus, on account of its slow progress and the small number of bacilli that are present. Whether or not the soil is here unfavorable to their existence, as has been often suggested, they are found in much smaller numbers in cutaneous than in most other forms of tuberculosis. The form that we have described as tuberculosis cutis offers the sole exception to this rule, as here the bacilli are usually found in great numbers; and therefore, as would be expected, the tissue shows, anatomically, a more advanced necrosis.

The larger representation of giant cells and the smaller number of epithelioid cells, as seen in lupus, are also characteristics of the more slowly developing forms of tuberculosis, as has been shown by experimentation upon animals, by feeding them with attenuated cultures of tubercle bacilli.

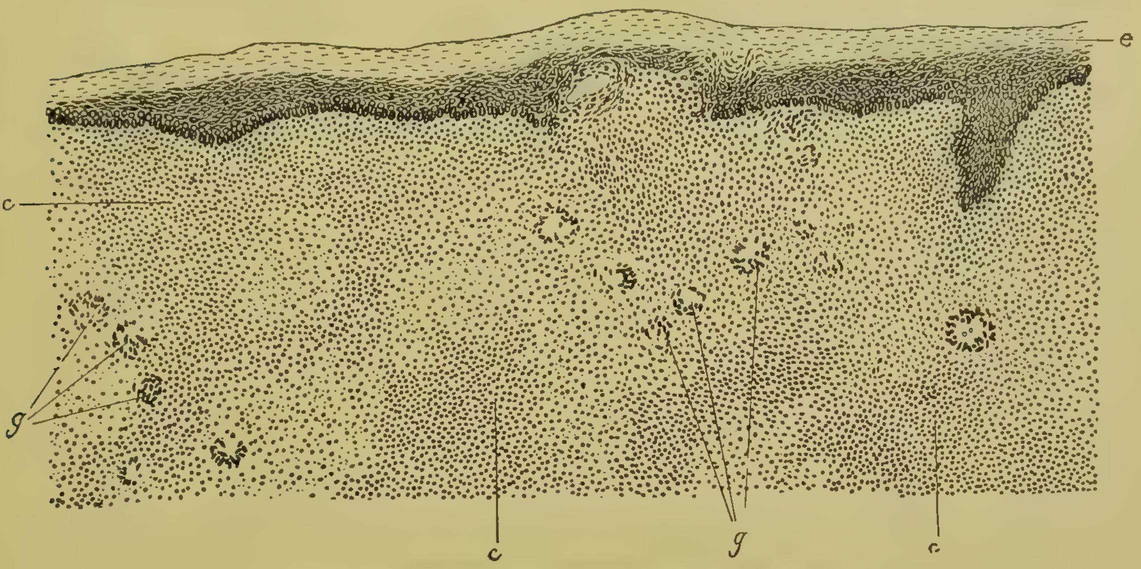


Fig. 42.—Section from a lupus of the skin, low power.
e, epidermis; *c*, corium infiltrated with the tuberculous neoplasm; *g*, Langhans giant cells.

Thus it should be emphasized that, from a purely anatomical standpoint, lupus can not be separated from tuberculosis; and Baumgarten, who was one of the chief opponents of the tuberculous theory from anatomical reasons, declares that not the shadow of a doubt can now exist of its true tuberculous nature.

The lupous nodules, or nests of tuberculous tissue lying in the corium, submit at a certain period to a process of degeneration. The cells lying in the center of the nodules are the first to be affected; their protoplasm becomes homogeneous, while the nuclei lose to a certain extent their susceptibility to staining—a process that is regarded by Weigert as a coagulation necrosis.

Together with this degeneration taking place in the epithelioid cells, there is also a regenerative process. The cells are capable of proliferation when not affected by the virus to the extent of advanced degeneration, and may finally become converted into connective tissue. In this manner is produced the lupoid scar-tissue that takes the place of the lupus nodule in the process of healing. Unna regards this cicatricial tissue as a true lupoid tissue and not an indifferent substitute for the absorbed tuberculous elements.

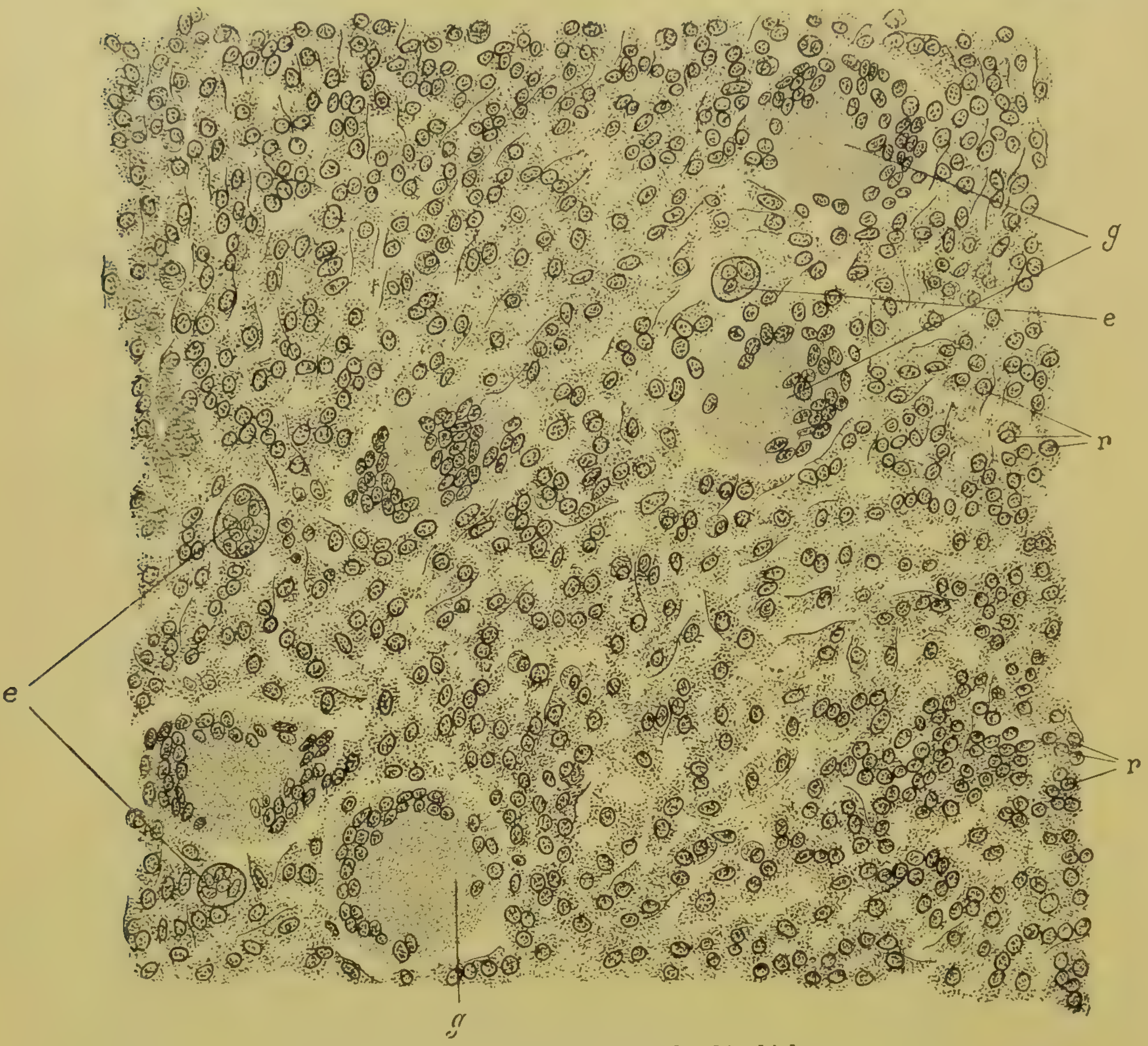


Fig. 43.—Section from a lupus of the skin, high power.
g, Langhans giant cells; *e*, epithelioid cells; *p*, small round cells.

An advanced stage of the regenerative process is seen in the elephantiasis that occurs in lupus. Here the tendency to the formation of new connective tissue is so great, and dominates the degeneration to such a degree, that large portions of the body are converted into dense masses of hypertrophied fibrous tissue, containing foci of degeneration to a greater or lesser extent, and presenting clinical appearances quite similar to those of advanced elephantiasis. This formation of new fibrous tissue in greater or lesser degree, as compared with the necrobiosis, is one of the causes of the multiplicity of clinical forms exhibited by the affection.

Another complication of lupus is the proliferation of epithelial elements that may take place. So far as our knowledge of the process extends, we must regard these phenomena as secondary and nonspecific, caused by the irritation produced by the new formation, and analogous to the epithelial activity in scrofuloderma and other chronic inflammatory processes. The rete may extend its interpapillary prolongations deep into the corium; and with the outgrowth of the papillæ, that is so constantly allied to the epithelial proliferation in all papillomata, the clinical forms of lupus papillaris verrucosa are produced. A proliferation of the glandular elements may also take place, as was emphasized long ago by the studies of Lang.

When the tuberculous infiltration of the corium has reached a certain grade of intensity, and the overlying epidermis has become stretched and thinned by the pressure from below, there frequently results a fracture of the epidermis, and the tuberculous foci are laid bare, giving rise to the various forms of lupous ulcers. In these instances there frequently, if not usually, exists a complication with a septic process. To the presence of the pus micrococci we must refer all true suppuration that attends a lupous lesion. The pus micro-organisms are very readily ingrafted upon cutaneous lesions of any nature, and the tuberculous lesion shares with others the liability to this complication.

Two rare forms of lupus have been described by Leloir, under the names of *lupus colloide* and *lupus myxomateux.* In the former, a colloid degeneration, similar to that found in the lung, is present; while in the latter the connective tissue, and in part the tuberculous new formation, have undergone a mucoid degeneration.

Occasionally a lupus becomes complicated with and converted into an epithelioma. When this occurs, the epithelioma usually pursues a more rapid course than usual, and when seated upon the face may give rise to the most frightful mutilations before a fatal termination is reached.

The tubercle bacilli are present in lupus in all its forms, although very sparingly. They are usually inclosed within a Langhans giant cell, although they may be found in other portions of the lupous infiltration. Very often it is necessary to look over a large number of sections before finding a single bacillus, and in general they are not sufficiently numerous to render failure to find them sufficient evidence of the nontuberculous nature of the lesion.

Tuberculosis Verrucosa Cutis.—In the typical cases of this form, as described by Riehl and Paltauf, we find greatly elongated and enlarged papillæ covered with a thickened, lamellated, horny layer, which also fills up the depressions between the papillæ. Between the cornified epidermal layers are found dried masses of exudation, with nuclei that are partially stained, and heaps of granular detritus. The interpapillary prolongations are hypertrophied and extend deeply into the corium in many places. The principal pathognomonic changes are found in the upper layers of the corium, in the papillæ and adjoining layers, which are filled with foci of closely aggregated cells. These foci consist of granulation tissue made up of round cells at the periphery, large epithelioid and Langhans cells toward the center; while the center itself, in the majority of cases, is formed of a necrotic mass indistinctly defined at its border. In a word, the histological appearances of tubercle are well defined. Besides these tubercles, foci of suppuration are also found at the points where the epidermis has penetrated most deeply, which finally break through the overlying tissue and form small crypts filled with horny masses from the continued growth of the epidermis. The tubercle bacillus was constantly found in the nodules of granulation tissue. Micrococci were

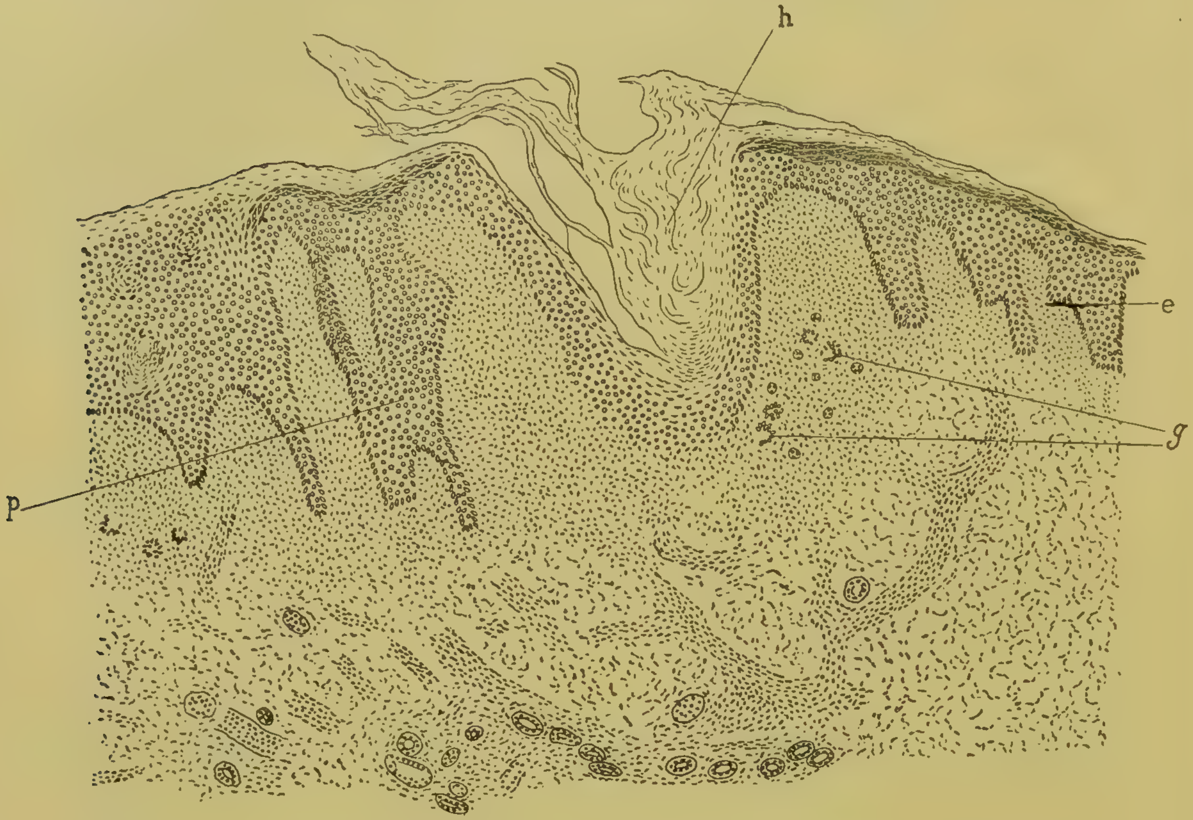


Fig. 44.—Section from a verrucous tuberculosis.
h, hypertrophied horny layer dipping down into the corium; *p*, epithelial down growths with enlarged papillæ between them; *g*, giant cells; *e*, enlarged papillæ.

found in all the parts where there was an acute inflammation and suppuration.

These inflammatory appearances are secondary phenomena and are often wanting. The bacilli may be more numerous than in an ordinary lupus, but I have failed to find a striking divergence in this regard. The chief anatomical characteristic of this form is the situation of the tuberculous neoplasm, as it is found quite constantly in the upper papillary layers, usually in the papillæ themselves. The boundary can not, however, be strictly drawn, and many cases are met with that represent transitional forms between the different varieties of cutaneous tuberculosis.

Scrofuloderma.—The anatomical characteristics of scrofuloderma, or tuberculosis of the subcutaneous tissues, differ in no essential way from those of tuberculosis of internal organs. A granulation tissue of small round and epithelioid cells, with a moderate number of Langhans giant cells, has its seat in the subcutaneous tissue, becomes degenerated, and may break through the thinned and tense layers of the epidermis above, giving rise to the well-known ulcer with soft undermined edges. The degeneration is usually much farther advanced than in lupus, large areas of necrotic softened tissue being visible under the microscope. Experiment by inoculation has, as has been said, proved beyond a doubt that these scrofulous glands and ulcers are a tuberculosis of the subcutaneous tissues. The specific tubercle bacilli are always present. Their detection may in some cases be a matter of considerable difficulty; in others they are very abundant; and in general they are much more numerous than is the case in lupus, but not so thickly sown as in tuberculosis cutis.

Etiology.—As it has been abundantly proved, by bacteriological and inoculation experiments, that lupus and scrofuloderma, as well as the other clinical forms of cutaneous tuberculosis, are due to the inoculation of the skin with tuberculous virus, we have only to consider, under the heading of etiology, the way in which this inoculation takes place.

This question has as yet received no final answer, owing, no doubt, in part to the comparatively short time that has elapsed since these various lesions have been regarded as tuberculous in nature, and to the consequent lack of statistical evidence. Many important facts, however, have been accumulated, especially those pointing to the frequency of the direct inoculation of the skin with the tuberculous virus, and the evidence in favor of the latter being the usual method of infection is rapidly increasing. A few authorities, clinging to the old idols, still invoke the aid of a special diathesis in the case of scrofuloderma, but experiment and clinical study have enabled us to dispense with the need of any such meaningless phraseology. Nor is it necessary to suppose that an inherited or acquired predisposition to infection must exist in the case of tuberculosis any more than in any other infectious disease.

Direct Inoculation.—The most striking example of direct inoculation of the skin is offered by the form that we have described as verrucous tuberculosis. The so-called anatomical wart so frequently found on the hands of those performing or assisting at autopsies or engaged in the dissecting room, is a form of verrucous tuberculosis, and it has been frequently proved that inoculation from a tuberculous subject was the cause. As a rule, there must be a previous cut or abrasion of the skin, or such a cut must be made at the time of inoculation. It has not been shown yet that inoculation can occur through the unbroken skin by means of the hair-follicles, although such a mode of infection can not be excluded.

This verrucous tuberculosis has been found to be of not uncommon occurrence, since attention was directed to its appearance by the careful studies of Riehl and Paltauf. It occurs frequently, as these writers have stated, on the hands of butchers, cooks, and people who have to handle animal products, where an easy opportunity for infection is offered. In some of the reported cases the verrucous tuberculosis was followed by lesions of other tissues from a propagation of the virus from the site of inoculation. Many instances of the appearance of scrofulodermata consecutively to these warty growths have been observed at the Massachusetts General Hospital, and are elsewhere reported. The tuberculous virus is carried along the lymphatic channels, the neighboring glands become much enlarged, and the scrofulous lesions make their appearance along the course of the lymphatics or from breaking down of the glands. Patches of typical lupus are also seen along this route of infection, illustrating the association and interchangeability of the various forms. Verchère relates a case where this verrucous tuberculosis was followed by general tuberculosis, and Pfeiffer that of a veterinarian who acquired a verrucous tuberculosis from a tuberculous cow, and died two years and a half later of phthisis. There is certainly sufficient evidence to show that the verrucous form is by no means an innocuous one, and that its existence is a constant menace to the life of its bearer.

Another remarkable fact is the frequency with which this verrucous tuberculosis is found upon people who have been nursing a phthisical relative, or who were living with a consumptive person at about the period when the lesion made its appearance. A favorable opportunity for contagion is offered by the handkerchiefs, soiled linen, and sputa cups of the patient. Dubreuilh relates the case of a young woman who washed handkerchiefs containing the sputa of a phthisical relative. Nodules developed upon her fingers, followed by suppuration of the glands of the axilla and scrofulous ulcers of the arm. The lesions of the hands became verrucous. Tubercle bacilli were found in all the lesions, and inoculation upon Guinea pigs gave positive results.

Instances of cutaneous tuberculosis are reported that arose from a secondary infection of wounds from stabs, from the holes made for earrings, and at the site of subcutaneous injections. Dubreuilh has collected seventeen cases of tuberculosis upon the penis after circumcision, in which the ritual operator, who had applied his lips to the wound, according to the custom, was in consumption.

Oftentimes the tuberculosis arises from auto-inoculation. In the case of the rare ulcerative variety (tuberculosis cutis, the form that has been described as occurring at the outlets of the mucous passages), the lesions are undoubtedly due to an auto-inoculation from the secretions rich in tubercle bacilli that are constantly passing over these places. The verrucous tuberculosis is frequently seen on the hands of consumptives, probably from wiping the mouth with the hand, or in some way bringing their hands into contact with the tuberculous sputum.

With regard to the classical lupus, the cases reported that can be traced to a direct inoculation are much less numerous, yet since attention has been directed to the subject a considerable number have been published. Leloir relates three cases: In the first, a characteristic lupus of the cheek appeared at a spot that had been the seat of a chronic eczema, which the mother of the patient—a woman far advanced in phthisis—had treated many times by a poultice of bread-crumbs moistened by her own saliva. In the second, a lupus of the nose developed in a young girl soon after the death of a phthisical sister, whose soiled handkerchiefs she had repeatedly made use of. In the third, a lupus of the nose appeared in a woman of thirty-one, at the site of an excoriation which had been repeatedly picked with the fingers while washing the handkerchiefs of a consumptive patient. Jadassohn reports a typical lupus of the forearm of a woman of thirty, that appeared at the site of a tattoo mark that had been made by a phthisical operator who used his saliva for moistening his pigments. Instances of typical lupous plaques developing on the ears after wearing earrings that had belonged to a phthisical relative are also on record, as well as lupus that had made its appearance at the site of wounds in subjects who had been intimately in contact with tuberculous secretions. In short, we have sufficient evidence to prove that lupus in its classical form may sometimes be caused by direct inoculation; and, this, together with the fact that investigation has only recently been directed into this channel, warrants the belief that it will be found to be a frequent mode of infection.

Indirect Inoculation.—Unlike the case of a direct inoculation, where the lesion produced is usually of the verrucous variety, an indirect inoculation usually gives rise to classical lupus, made up of individual lupous nodules. Thus it is very common to see lupous nodules appearing in the cicatrix of a scrofulodermatous lesion—another proof, as Leloir remarks, of the tuberculous nature of lupus. Lupus may also appear at the cutaneous borders of a tuberculous fistula, and I have seen one case where a large part of the buttocks was the seat of a typical lupus vulgaris, which had started soon after an operation for *fistula in ano.* So also deep bone lesions and glands that have broken down may infect the skin secondarily, and cause a typical lupous patch. Occasionally the verrucous form may be produced by indirect inoculation, but usually it is a typical lupus.

This mode of inoculation is not so unusual as one might suppose, as Leloir's statistics show one hundred and four cases among three hundred and twelve observations of lupus. Of these one hundred and four cases, the lupus followed a tuberculosis of the glands in thirty-two, a tuberculosis of the subcutaneous tissue (scrofuloderma) in forty-one, and tuberculosis of the bones and joints in twenty-nine.

Another method of indirect inoculation is by transmission of the tuberculous virus from a deep-seated gland or bone lesion to the skin by means of the lymphatics, without affecting the intervening tissues. Plaques of lupus, as well as lesions of the type scrofuloderma, have been observed at a distance from tuberculous glands and osseous lesions, along the course of the lymphatics. Sometimes the lesions are arranged in bands or rows following closely the lymphatic trunks.

Heredity.—Since it has been established that tuberculosis is an infectious disease caused by a specific micro-organism, and since its transmission by direct and indirect inoculation can be proved in so many instances, the part played by heredity is growing to be considered as much less important than formerly. In the case of cutaneous tuberculosis the possibility that it may at times, especially in the form of typical lupus, be transmitted to the offspring, can not be excluded. In point of fact it has not been shown that cutaneous tuberculosis occurs to any noticeable extent among the descendants of tuberculous subjects. As instances of undoubted *congenital* tuberculosis are extremely rare, if they exist at all, it is always impossible to say that the affection may not have been acquired in the early days or weeks of life, and the intimate association of the child with the mother at this time would offer an easy opportunity for infection. It has been found that when the mother was consumptive the proportion of consumptive children was larger than when the father was the affected parent, and the explanation has been thought to lie in the greater opportunity offered for infection from the mother. Baumgarten, the great exponent of the theory of heredity in the transmission of tuberculosis, believes that the greater part of all cases of lupus are produced by hereditary transmission of the virus. It is necessary, according to this theory, to suppose in most instances a period of absolute latency of the virus—a period during which many opportunities for infection may occur. In short, the hereditary origin of the disease is one susceptible of little proof, as almost all the cases can be equally well explained on the supposition of an infection after birth. We know that this post-natal infection occurs; we do not know absolutely that the disease is ever hereditary.

Age.—Hebra asserted that lupus rarely developed after the age of twenty, and, as a rule, made its appearance in early childhood. It has of late been claimed by more than one observer that the cases of lupus beginning later in life were more common than had been supposed, and with this opinion we must agree. Still, the fact is undeniable that the greater part of the cases of typical lupus begin in childhood, which must be accounted for by the greater susceptibility of the skin in youth to the invasion of the bacillus. The disease is also more frequently of an active and progressive type at this age.

Association with Pulmonary Tuberculosis.—It has been satisfactorily proved that pulmonary tuberculosis coexists with or follows a tuberculosis of the skin in a larger proportion of cases than could be accounted for on the supposition of a coincidence.

Leloir's careful observations of three hundred and twelve cases of cutaneous tuberculosis showed that of this number ninety-eight presented signs of pulmonary tuberculosis. Renouard found fifteen cases of pulmonary tuberculosis in one hundred and thirty-seven lupous patients, while Haslund reported that sixty per cent of his cases were phthisical. Other observers whose results were similar are Besnier, Neisser, and Bender. It is very difficult to prove absolutely that in all these instances the pulmonary tuberculosis was secondary to the cutaneous lesion, and not an independent infection. The frequency of their association may, however, be regarded as significant.

Diagnosis.—Although a typical case of lupus offers little difficulty in diagnosis to one who has had some experience with skin affections, there are many examples of cutaneous tuberculosis whose recognition is by no means easy. In the case of lupus, the chief diagnostic characters, as emphasized by Neisser, are its beginning in early childhood and its long, tedious course. Objectively, the diagnostic points are the soft consistency of the neoplasm, the formation near the old plaques of primary lesions consisting of small, yellowish-brown, easily depressible nodules; and the slow development of these primary nodules to larger plaques, which degenerate and form ulcers after a protracted period.

Lupus is most frequently confounded with syphilis, and it is oftentimes impossible for the most skilled diagnostician to determine with certainty, without watching the course, which of the two diseases he has to deal with. This is especially the case with ulcers about the nose and face. The history is by no means of great value, as in the case of syphilis the lesions usually arise from an infection so old that data are hard to obtain. A tuberculous ulcer runs a much less rapid course than a syphilitic ulcer; is more likely to have begun in early childhood; is more likely to be single, or confined to a small portion of the integument, and less likely to assume a circinate or reniform shape. The edges of the tuberculous ulcer are softer, more apt to be undermined, less sharply cut; its floor more granular, more readily bleeding. If lupous nodules are found at the periphery, they are, of course, pathognomonic. When lupus invades the nose it rarely attacks the bone and cartilage until a late period; while with syphilis the bony framework may collapse before the skin has been notably affected, giving rise to the peculiar sunken appearance of the syphilitic nose.

The diagnosis may only be determined by watching the course of the affection, waiting until new nodules make their appearance. The exhibition of iodide of potassium in many instances will determine the character of the affection, a very quick improvement under its use pointing pretty conclusively to syphilis.

Tuberculosis cutis—*l'ulcère des phthisiques*—is differentiated from a syphilitic ulcer by the presence of miliary tubercles, or of the scalloped edges caused by their degeneration, by the soft consistency, and by its slower course.

Tuberculous ulcerations may sometimes be confounded with epithelioma. Epithelioma is more likely to occur in persons advanced in years, and to be painful, and is especially characterized by the greater hardness of its edges in comparison with tuberculosis or syphilis, and by the presence of epithelial pearls.

The verrucous tuberculosis may be mistaken for a simple wart or papilloma, as was usually the case before its true nature was known. It is to be distinguished by taking into consideration all the characteristics that we have enumerated, including its mode of origin and its course. A chronic circumscribed eczema may bear some resemblance to a patch of tuberculosis of the skin. But an eczema is hard and firm, and is not readily penetrated by a blunt instrument, never ulcerates or heals by the formation of cicatrices, and spreads by a uniform extension, and not by the irregular cropping out of nodules of disease in the neighborhood.

Other affections that are said to have been sometimes confounded with tuberculosis are leprosy, glanders, and sarcoma.

Lastly, with regard to the microscope and inoculation as a diagnostic test. The presence of the bacillus tuberculosis is of course pathognomonic, but it is so very sparsely represented that failure to find it can rarely be accepted as proof of the nontuberculous nature of a lesion. Nor can the histological characteristics be always relied upon as conclusive proof. If it be a question of epithelioma, the latter may almost always be differentiated by the microscope; but syphilis, especially in its lichenoid and gummatous forms, presents many points of similarity with tuberculosis. A probable diagnosis may be made by the microscope; rarely a positive one unless the bacillus is found.

Inoculation experiments are rarely practicable, but a positive result by a trained observer is of course convincing.

Prognosis.—Unfortunately, one of the chief characteristics of the tuberculous nodule is to recur, and for this reason the prognosis can not be said to be a very favorable one. Certain of the forms are more rebellious than others. Destruction of the new growth, which, as we shall see, is the chief therapeutic aim, is followed in the case of scrofuloderma and of verrucous tuberculosis by good results as a rule, although even here a recurrence in the form of typical lupous nodules may appear in the cicatrices.

A spontaneous involution of all forms of cutaneous tuberculosis is possible; yet it is a rare occurrence, especially in the case of a typical lupus. As the lesions are situated in the corium and subcutaneous tissue, a cicatrix is the inevitable result. This spontaneous healing is often only temporary, and new foci of disease may appear in the cicatrix.

As a rule, however, if left untreated, the duration of the disease is indefinite, and fresh outbreaks are likely to appear constantly. If properly treated, the disease may remain for a long time, or forever, healed. Recurrences are, however, always to be apprehended. A cicatrix is the result of treatment, and should always be counted upon before beginning.

The form of the lesion is of importance as regards the prognosis. Verrucous tuberculosis and scrofuloderma are more amenable to treatment than are plaques of disease where small typical lupous nodules are seen seated in a dense fibrous tissue.

Treatment.—We have as yet no specific treatment for cutaneous tuberculosis. We have no knowledge of any substance that, introduced into the circulation, is capable of neutralizing the effects of the virus to such a degree that a natural process of absorption, followed by the disappearance of the neoplasm, takes place—as is the case with the iodide of potassium and mercury in syphilis. The hope that such a material was soon to be given us was raised in some by the extraordinary statements made by the first experimenters with Koch's *tuberculin.* To the credit of dermatologists, however, it should be said that they did not participate in the over-enthusiasm provoked at the outset; and when at last the substance was given into the hands of those trained in the manifold appearances and changes of cutaneous tuberculosis, results very different from those indicated by the first deplorable statements were recorded. The remarkable impression made on tuberculous tissues by the injection of this substance is still of importance from an experimental point of view, but therapeutically the use of tuberculin has been practically abandoned. It is impossible to produce the local action without a more or less violent general reaction, which is in some instances a menace to the life of the patient. Furthermore, it is not possible to obtain a complete healing of the lesions by this means. The substance sometimes causes a distinct aggravation of the disease, and the results are far inferior to those attained by the old methods of treatment.

Prophylactic Treatment.—From the light that has been thrown upon the etiology of this disease, it has become possible to formulate rules that may conduce to its limitation. The following prophylactic treatment is suggested by Leloir:

1. To avoid, as far as possible, bringing the integument into contact with the tuberculous virus, whatever may be its origin.

2. To treat antiseptically every wound that may have been contaminated by the tuberculous virus.

3. To destroy, as rapidly and as completely as possible, every *deep* tuberculous deposit that may inoculate secondarily the integument.

4. To make aseptic every part of the skin soiled by fluids that contain tuberculous virus, as sputum, fæcal matter, uterine discharges, etc.

5. To guard with the greatest possible care the skin of patients affected with internal tuberculosis.

6. To watch over the general health of those descended from tuberculous subjects, by a careful attention to hygiene and general therapeutics.

The importance of prophylaxis can not be too much emphasized. With our present knowledge, it may be assumed that we are as well able to avoid cutaneous tuberculosis as we are to avoid inoculation with syphilis; and the most important duty that devolves upon us is to impress its contagious nature upon the minds of the people, and to urge with persistency the necessity of precautionary and prophylactic measures.

Internal Treatment.—Internal medication, employed alone, is incapable of healing cutaneous tuberculosis. Much may be accomplished, however, by a careful attention to hygiene and by the use of drugs that tend to improve the general nutrition. Cod-liver oil is especially valuable in patients whose general condition is below par. It has been thought that arsenic given for a long period aided the absorption of tuberculous infiltrations. The iodides and iodoform have had their advocates, and are said to have exercised a favorable influence. Iron, quinine, the bitter tonics, ferruginous mineral waters, and the various drugs that have proved their usefulness in states of depraved nutrition, are of value oftentimes in tuberculosis of the skin.

External Treatment.—The real treatment of cutaneous tuberculosis is external, and for the most part surgical and mechanical. A great many different methods have been proposed, which are to be employed and varied according to the form of the disease, the age and general condition of the patient, and the size and localization of the lesion. Almost all authorities are agreed that no one method can be claimed as satisfactory in all cases. While admitting this, each dermatologist who has had large experience and an opportunity for trying different methods, inclines to one or another method as in his judgment the best, or as suiting a larger number of cases. The fact that there is as yet no absolute agreement among these authorities would suggest that the success of the various methods depends largely on the operator's familiarity with his favorite mode, and on the care with which the minutiæ are elaborated.

Treatment by Chemical Caustics.—This method of treatment for a long time enjoyed greater popularity than any other. To-day it has ceded its position to the surgical methods, although considerable use is still made of it, and its value in certain cases should not be depreciated. The objections to its use are the great amount of pain caused and the destruction of tissue that results.

One form of chemical caustic, at least, has much claim to favor to-day—the solid stick of nitrate of silver. As Kaposi says, it has sufficient resistance to penetrate into each tubercle, and adds a mechanical to the caustic effect; and it has the further advantage of doing no harm, as it does not penetrate into the sound skin. Large masses of infiltration may be destroyed in this way, as well as isolated tubercles. It may be applied where the patient shrinks from the surgical or bloody methods, and, although painful, the average patient will, in my experience, submit to it for a greater number of times without revolt than to most other methods. It is not so applicable to the warty and sclerous forms, unless preceded by curetting or by the actual cautery. It is essential that the crayon be well made and firmly attached to a convenient handle.

Nitrate of silver in a concentrated solution (equal parts of nitrate of silver and of water) may be used in the ulcerated forms. If the skin is intact, a previous application of a solution of caustic potash (1 to 2) will be necessary to dissolve the epidermis and expose the underlying foci of disease.

Chloride of zinc, in the form of Canquoin's paste, spread upon cloth and applied to the diseased patch, causes a destruction of both the healthy and diseased tissues, and is now but little employed.

Arsenical paste has been much used in Vienna, and has the advantage of attacking only the diseased territory. It is composed as follows: White arsenic, 1; cinnabar, 2; unguentum emollient, 24. This is spread upon linen and applied for three days, renewing the paste daily. The pain is quite intense. On removing the paste the tuberculous lesions alone are found to have been destroyed, the sound skin remaining unaffected. An advantage of this method is the quickness of its effect. Kaposi has never seen symptoms of intoxication from the absorption of the arsenic, but does not recommend its application to a surface larger than the palm of the hand at one time.

Other caustics that have been employed are the Vienna paste, Landolfi's paste, lactic acid, carbolic acid, pyrogallic acid, etc. Of these, pyrogallic acid possesses the advantage of sparing the sound skin. Of all the chemical caustics, nitrate of silver, in crayon form, is by far the most serviceable, and has the great advantage of being unattended by danger.

Unna claims to have obtained brilliant results from the use of salicylic-acid plaster (twenty-five to fifty per cent), to which creosote is added to deaden the pain. The action of salicylic acid is chiefly that of a dissolvent of the epidermis, and its value lies in its property of laying bare the deep-seated lupous nodules. Afterward it is necessary to make use of other and stronger agents, such as the crayon of nitrate of silver, or lactic acid. Plaques of tuberculosis verrucosa may be destroyed by applying a strong salicylic-acid plaster, and, after the hypertrophied epidermis has been macerated and destroyed, boring freely with the nitrate-of-silver crayon, or lightly curetting.

Surgical Treatment.—*Excision.*—This method of treatment, which would seem to offer so many advantages, has proved to be disappointing in practice. If the tuberculous patch is of considerable extent, or is upon the face, the amount of tissue lost is too great in comparison with that resulting from other methods to justify its adoption. Even in the case of small nodules it has been found that there is apt to be a recurrence of the disease in the cicatrix, and the latter is often hypertrophied and unsightly. The application of Thiersch's method of skin grafting after excision has been followed by good results in cases reported by Thiersch, Lange, Jarisch, and others, and would seem to offer a favorable chance in certain selected cases. An isolated patch of verrucous tuberculosis may often be treated successfully by excision.

Curetting.—This method, introduced by Volkmann, has been widely used, and is of great service in many cases. It consists in scraping the tuberculous area with the sharp spoon or dermal curette, which brings away the softened, diseased tissue, but does not easily penetrate the healthy tissue. The method is especially applicable to large confluent masses of tuberculous tissue, or to verrucous and sclerous lesions. It is not applicable to an old patch of lupus, in which deep-seated lupous nodules are imbedded in the fibrous tissue. The hæmorrhage resulting may be easily controlled by compression. The wound may be dressed with iodoform or boracic-acid dressings, and the granulations, if exuberant, may be kept down by cauterization with the crayon of nitrate of silver.

Linear Scarification.—The treatment of lupus by scarification was first instigated by Volkmann, modified by Balmanno Squire, and finally brought to a point of great perfection by Vidal, of Paris. Vidal's scarifier consists of a small flattened blade two to three centimetres long and two millimetres wide. There are two cutting edges about a centimetre from the point, which is triangular, and is one and a half to two millimetres in length. The instrument is held in the hand after the manner of a pen, and manipulated by the fingers alone, the outer edge of the palm of the hand being firmly fixed upon some support. The incisions should always be perpendicular to the surface, and are to be made in parallel lines at a short distance apart, then crossed by another series of parallel incisions in such a manner as to form with the first series angles varying from 30° to 60°. The depth to which the incision extends is to be regulated according to the degree of resistance met with. The second series of incisions can then be crossed obliquely by a third or fourth series. The hæmorrhage, which is more excessive in the first than in the later operations, may be readily arrested by compression with absorbent cotton. The subsequent dressing varies according to the case. The incisions usually heal in four or five days, and Vidal repeats his operation at intervals of eight days.

It is better to perform the scarifications without local anæsthesia, if possible, as the freezing mixtures used make the skin so white and hard that it is difficult to see the diseased points, or to feel the difference in consistency in the tissues.

When treating a lupus that has not progressed far, it is best to scarify beyond the apparent edges of the neoplasm, as the vessels of the periphery are probably affected. In the rapidly progressive forms of lupous ulcer scarification is very efficacious, checking their progress in two or three sittings. In the deeply infiltrated sclerous forms scarification is not so successful.

After some weeks or months of treatment the appearance of the tuberculous patch becomes changed, the disease being represented only by small yellowish recurrent nodules scattered over the cicatrix. Here the employment of the scarifier is less satisfactory. Brocq has advised treating these nodules with the crayon of nitrate of silver after using the scarifier. The duration of the treatment is variable, but in general covers a long period. The great advantage is that the cicatrix is much softer and less conspicuous than that obtained by any other method, and is therefore to be recommended in lupus of the face in people who demand the least amount of disfigurement.

The objections to this method are its long duration, the difficulty in getting people to submit to it, and the possibility that it may lead to an extension of the tuberculous infection by means of the lymph channels, which may result in internal tuberculosis. This objection has been raised by Besnier to scarification, as well as to the other "bloody" methods; and although the question is by no means finally settled, experience at the Hôpital St. Louis has so far favored this view that it should be taken into consideration when deciding upon a method of treatment. Dr. Morrow, who has had especial opportunities for observing and applying Vidal's method, speaks of the results in the highest terms.

Cauterization by the Thermocautery and the Electrocautery.—The tuberculous infiltration may be destroyed by the Paquelin cautery, or the Paquelin may be used after raclage, or in conjunction with other methods.

The galvanocautery was first employed by Hebra, but the method has been elaborated by Besnier, and is used by him in preference to all others, although not exclusively. Besnier has invented numerous cautery points and blades suited for different cases, with which he punctures and scarifies the diseased tissues. When the disease is not extensive, punctures are made about one millimetre apart, so that the whole plaque is literally tattooed. The method is of great value in destroying the small yellowish recurrent lupous nodules in the cicatrices, and also in lupus of the mucous membranes, where scarification is of difficult application. The platinum point should never be brought to a white heat, so that bleeding may be avoided, and that the operator's vision may not be disturbed by the light.

The pain is considerable, but ceases as soon as the needle is withdrawn. The objections to its use are the extreme terror that the formidable apparatus inspires in many patients, and the large number of sittings required, which are not, however, so many as in scarification. The method may be well applied to tuberculosis verrucosa and the secondary papillomatous forms of lupus. The anatomical tubercle is thus treated by Besnier, at repeated sittings, and he reports very favorable results.

Mixed Treatment.—It is often of advantage to combine several of the methods that have been described. The same diseased area may at one time be treated by curetting, at another by salicylic plaster, and at a third by scarification or cauterization. Leloir employs a mixed treatment, which was devised in order to shorten the duration as far as possible, and to abridge the period when recurrences occur. Any crusts that are present are first removed with poultices or ointments, or, when there is epidermic hypertrophy, a strong salicylic-acid paste is used to lay bare the tuberculous foci. Afterward the parts are curetted thoroughly, taking care to destroy the whole plaque at a single sitting. The thermocautery is used after the raclage, if there are many fungous and bleeding points, and finally a second curetting with a smaller instrument is performed, and the bleeding checked by tampons of absorbent cotton moistened in iodoform or ether. In the case of verrucous and sclerous forms, Leloir cauterizes first with the thermocautery, or with Besnier's galvanocautery, after which the curette may be used with great advantage and ease. In the case of a deep lupus of the nose, or about the mucous orifices of the face, or of the fingers and toes, the operation is not completed at once, but divided over two or three sittings. Various antiseptic dressings are used; and if, as is usual, a further cauterization is necessary, lactic acid, pyrogallic acid, or some other chemical caustic, is applied for several days, according to the case; and, later, use is made of the crayon of nitrate of silver to destroy what remains of the tuberculous tissue. Mercurial plasters, pastes containing salicylic acid, salol, etc., are also brought into use.

Electrolysis.—This method was proposed by Gärtner and Lustgarten. They destroyed the tuberculous nodules by applying to the diseased tissue a silver plate surrounded by a hard rubber ring and connected with the negative pole of a battery. A great advantage claimed for this method was its comparative painlessness. Dr. Jackson, of New York, reports good results from this method, as well as from the employment of the single needle. The writer has successfully treated the small recurrent lupous nodules in a cicatrix by boring into them with the electric needle. When there has been much ulceration this method is of less value; and while it is difficult to believe that it will ever supplant the methods by cauterization and raclage, it is a useful addition to our resources, especially in cases where the tissue is firmly organized.

LUPUS ERYTHEMATOSUS. (J. T. Bowen.)

INTRODUCTION.

This affection, despite its name, is not considered by a majority of the best observers to be in any way related to tuberculosis, of which lupus vulgaris is the most common variety. Nevertheless, as several high authorities, headed by Besnier, of Paris, still argue, with much ability, in favor of its tuberculous nature, the question will be further discussed, in deference to their opinions, under Etiology and Pathological Anatomy.

The name *lupus erythematosus* was given to this disease by Cazenave, in 1851, lupus being suggested chiefly by the fact that both processes heal with the formation of scar tissue. This name has been retained, and is the usual designation to-day, despite the attempts of Veiel, Volkmann, and latterly of Unna, to substitute a more fitting appellation. Under the name *seborrhœa congestiva* Hebra described a similar condition, which may precede and develop into a lupus erythematosus; but he afterward accepted the latter name, as proposed by Cazenave.

Symptomatology.—Lupus erythematosus makes its appearance in the form of one or several spots, from the size of a pin's head to that of a bean, slightly raised, of a bright reddish color, which do not entirely disappear under the pressure of the finger. In the center these spots are either covered with a scale, or show a slight cicatricial atrophy, the latter condition being more and more apparent as the lesions become older. These spots pursue a very slow chronic course, gradually increasing in size by centrifugal extension of the bright red, raised, erythematous border, while the central portion becomes covered with firmly adherent scales, or more and more depressed and atrophied. The erythematous border is firm to the touch, and sharply bounded from the sound skin.

A prominent feature of these lesions, although not an absolutely constant one, is the alteration in the mouths of the sebaceous glands. The follicular orifices are seen to be enlarged, gaping, or filled with hardened sebaceous matter. Sometimes the central portion is covered by a firmly adherent seborrhœal crust, which is found to dip down into the enlarged follicular mouths when detached. These disks increase very gradually until they attain a certain size, and then as a rule remain stationary for a variable period of time, months or years. When they begin to disappear, the first change is a diminution in the color and prominence of the edges. The erythematous halo, so characteristic of the disease, fades away, the raised margin becomes level with the sound skin, while the central portion remains depressed, glistening, and atrophied—a slight but permanent cicatrix. During the course of the original spot of erythematous lupus other lesions usually appear in its neighborhood. In some cases the lesions are irregularly arranged, in others a certain symmetry is observed.

A favorite seat of lupus erythematosus is the dorsum of the nose and the cheeks, and in this situation its symmetry is especially observable (Fig. 45). It sometimes assumes a form that has been described as that of a butterfly, the extension of the disease outward upon the cheeks forming the wings, and the point of union of the two lateral portions on the dorsum of the nose the body (Hebra). The ears also are frequently attacked, and often will be symmetrically affected, at the same time that a butterfly lupus is present on the nose and cheeks. Lupus erythematosus of the ears simulates chilblains very closely. On the lips isolated plaques are often seen, but they rarely attain a large size. The scalp is a not uncommon seat, either as the sole focus of disease, or in conjunction with lesions of the face. It causes complete alopecia in the affected territory, the skin appearing atrophied and shining. Usually dilated follicles or comedolike appearances can be seen in the diseased area. The bright, raised, erythematous border, so characteristic upon the face, is not well seen upon the scalp. The affection also occurs upon the backs of the hands, usually in the form of scattered disks, and here it is apt to be symmetrical.

Various subdivisions into clinical varieties have been made by some authorities. Kaposi divides the disease into the discoid and disseminated form. The *discoid form* corresponds to that we have been describing. The *disseminated form* occurs when large numbers of small disks appear upon the favorite seats of the disease, as well as other portions of the body. Some of these disks undergo involution, others persist for months without increase in size. Sometimes an acute febrile invasion takes place, accompanied by articular manifestations and nocturnal headache, and occasionally an erysipelatous inflammation of the face is observed, which remains localized, and to which Kaposi has given the name *erysipelas perstans faciei.* This erysipelatous outbreak was accompanied by typhoidal symptoms, and resulted fatally in one half the cases.

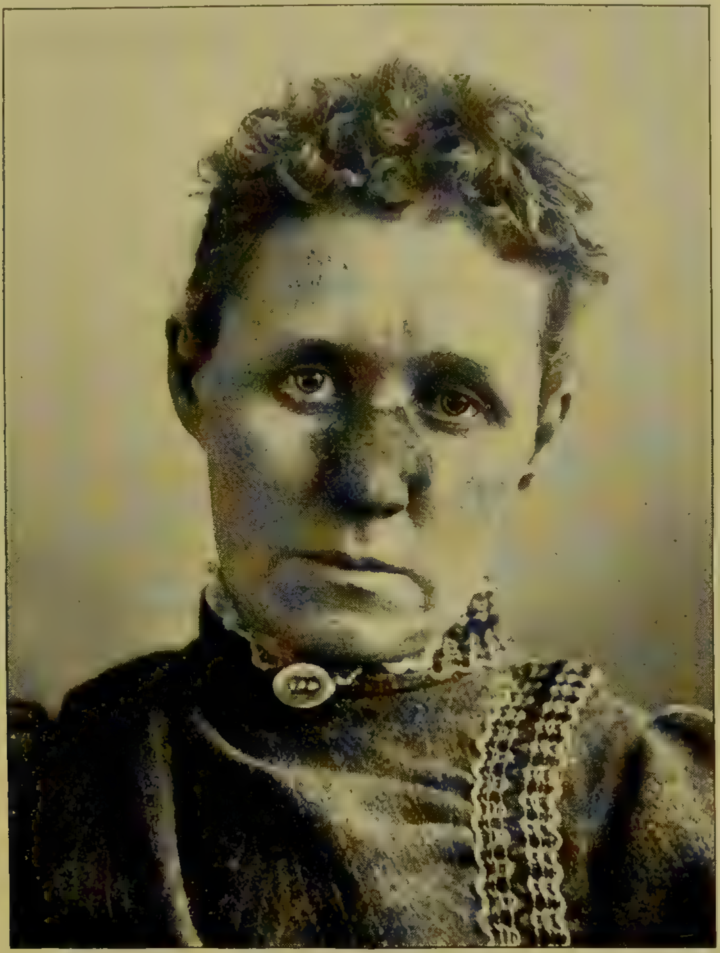


Fig. 45.—Lupus erythematosus.

Besnier divides the disease into the *vascular* and the *follicular* forms, according as the erythematous features or the follicular changes are the most pronounced. Certain malignant forms are also described, followed by pulmonary and renal manifestations. Brocq considers that two distinct types of disease have been confounded in France under the name lupus erythematosus. The one, characterized by its localization, chiefly upon the face, by its symmetry and by its rapid extension and amelioration, he calls *erythème centrifuge symétrique.* The other, *lupus erythémateux fixe*, is characterized by its more indurated base, by its slow evolution, and by its rebelliousness to treatment. This latter form he considers due probably to an infection with tuberculous virus, and to belong in the same group with lupus vulgaris.

The disseminated and malignant forms that have been referred to are of rare occurrence. In America the only case that corresponds to them has been described by Hardaway.

Lupus erythematosus of the mucous membrane is of rare occurrence, and its diagnosis would be a difficult matter without the presence of the disease upon the outer skin. It appears in the form of plaques, covered with punctate excoriations of red color, or spotted with grayish masses of exudation and superficial cicatrices.

The course of lupus erythematosus is exceedingly slow, and the disease may persist for many years without marked change.

Pathology.—The pathology of lupus erythematosus is not well understood, and is entitled to but a brief notice in a practical treatise like this. All attempts to discover a micro-organism, or to demonstrate the cause of the disease, have been in vain.

The corium is found to be the chief seat of alterations. It is filled with a dense infiltration of small round cells, of greatest intensity in the upper portions, and grouped by predilection along the course of the vessels. These cells are found in places to have undergone a granular and fatty degeneration, which does not affect the cells *en masse*, but individually, and as if by hazard, as Leloir has pointed out.

The infiltration of small cells is continually, then, undergoing granular and fatty degeneration, which ends in their absorption and disappearance, while at the same time a fresh infiltration of cells is making its appearance. The connective tissue is also absorbed in this process, and in this way the atrophic cicatricial condition so characteristic of the disease is produced.

Many of the cutaneous blood-vessels are enlarged, and filled with red corpuscles. Hæmorrhages, either diffuse or in foci, are often seen, especially in the upper layers of the corium. Newly formed blood-vessels are also met with.

The sebaceous glands are much hypertrophied, and affected with hypersecretion. They are later on involved in the cell infiltration, becoming fatty degenerated, and may disappear completely. Usually the process does not progress to this stage, and the glands remain hypertrophied and filled with altered sebaceous matter and dried epidermic cells.

The outlets of the sweat glands are also attacked and may become fatty degenerated.

The chief alteration of the epidermis is one of atrophy. The rete Malpighii is much thinned, and the interpapillary prolongations and the papillæ of the corium are so much reduced in size that the lower edge of the epidermis loses to a great extent its normal serrated appearance. The granular layer and the stratum lucidum usually disappear, and the outer horny layer becomes thin and atrophied.

Etiology.—Lupus erythematosus is essentially a disease of adults, very rarely occurring in childhood. Kaposi has seen one instance in a child of three years. Women are much more frequently affected than men. Chlorosis, anæmia, dysmenorrhœa, etc., have been said to occur frequently in those affected with this disease. In a large proportion of cases, however, no other signs of ill health can be detected, and the relationship of the above-mentioned disorders to the disease in question may well be doubted.

The question of the relationship of lupus erythematosus to lupus vulgaris, or tuberculosis of the skin, is one that has given rise to much controversy, and deserves more than a passing notice.

Those who believe in the tuberculous nature of lupus erythematosus declare that the disease is often accompanied with or followed by persistent glandular swellings, and by tuberculosis of the lungs and viscera. This they claim for the ordinary chronic forms of the disease, as well as for the rare, malignant variety, which is quickly followed by pulmonary, cardiac, and renal troubles. Tuberculous affections of the joints are also mentioned by Besnier as frequent complications. The large experience of Besnier and others who defend this view entitle it to much consideration, although my own experience and that of the majority of dermatologists in Europe and America is not in accord with theirs. In the cases that have come under my observation in America and in Europe a tuberculosis of other parts was very rarely to be observed. There is force, however, in Besnier's reply, that a careful, impartial examination with regard to this point has rarely been made, and that it was only after attention had been directed to the subject that visceral complications were found to be much more common in tuberculosis of the skin than had been supposed. He asserts that it is a daily experience with him to find a history of tuberculosis in cases of lupus erythematosus, either in the family of the patients or among the persons with whom they are in constant contact, or whom they have been nursing in the course of a tuberculous affection.

Besnier further observes that if these patients are followed, very few are found to arrive at old age, and that is why Kaposi has not seen the disease in old people. If these people lived as long as the majority, why should not one observe the disease or the cicatrices that result from it among old people?

Another argument earnestly put forth by those who believe in the tuberculous theory is, that transitional forms between lupus erythematosus and lupus vulgaris occur. Vidal, however, who had declared that lupus erythematosus may be the prelude of and merge into lupus vulgaris, lately modified his creed by the statement that lesions having some of the characteristics of lupus erythematosus may be the prelude of lupus vulgaris. Besnier observes that in the two types some varieties approach one another so nearly that it is not always easy to say where the lupus erythematosus begins and where the lupus vulgaris ends; furthermore, that cases are seen bearing on the hand—for example, a typical papillomatous lupus, or a verrucous tuberculosis; while upon other portions of the skin—on the face, for example—lesions analogous to lupus erythematosus are present.

For the majority of dermatologists, however, lupus erythematosus, although its etiology is obscure, is an affection entirely distinct from cutaneous tuberculosis. It seems to us that the clinical characteristics are sharply defined and totally unlike those seen in any of the forms of tuberculosis. We have seen cases occasionally where there might, on first examination, be some hesitation in deciding between the two affections; but, as a rule, lupus erythematosus is far more apt to be confounded with some other diseases than with tuberculosis. The rare cases where lupus vulgaris or other forms of cutaneous tuberculosis are found to occur coincidently with a lupus erythematosus may be satisfactorily explained on the supposition of the existence of two independent affections at the same time—a not unusual occurrence in dermatology. From an anatomical standpoint the affections are totally distinct. The histological structures are quite dissimilar, and the tubercle bacillus, although repeatedly sought for, has never been found in lupus erythematosus. Inoculation experiments with the tissues of lupus erythematosus have been made upon animals without producing tuberculosis. The experiments of Leloir are of especial value, on account of his great experience in experimental inoculation of lupus, and of the perfection of his methods. He was never able to obtain the least sign of tuberculous infection in the animals inoculated with the tissue of lupus erythematosus.

Diagnosis.—The diagnosis of lupus erythematosus is not, as a rule, difficult. Nevertheless, there are certain affections with which it may be confounded, and which often resemble it quite closely. Tinea trichophytina may be differentiated by the fact that it usually occurs in young subjects, by the microscopical demonstration of the trichophyton tonsurans, and by the absence of a central cicatrix, and of dilated sebaceous follicles.

Syphilis.—Discrete, orbicular types of syphilis are characterized in distinction from lupus erythematosus by their much more rapid onset and course, by the firmer infiltration of the edges, and by the lack of inflammatory manifestations that disappear on pressure.

Discrete forms of eczema and psoriasis may at times resemble lupus erythematosus. They never give rise to a central cicatrix, nor present the characteristic edge of lupus erythematosus, and they are rarely so chronic in course.

Frost-bites are often seen on the fingers, hands, or upon the face, which simulate lupus erythematosus very closely. They are distinguished by their course, by their association with exposure to the cold, and by the absence of central cicatrization and follicular enlargement.

Prognosis.—As a rule, the prognosis is not unfavorable so far as danger to life or the impairment of the general health is concerned. For those who believe in its tuberculous nature, every case must present the possibility of danger from a dissemination of the poison. The disseminated form that has been described by Kaposi is of much more serious import, as it has been accompanied by cerebral manifestations and visceral complications that have ended fatally. These visceral complications are by some regarded as the visceral localizations of the disease. Pulmonary tuberculosis has been noted as a sequel in some instances.

The majority of patients seen in America do not, however, exhibit any symptoms of disease apart from the cutaneous lesions. But these lesions are characterized by their long, tedious course and by the stubbornness with which they often resist treatment. They may disappear rapidly or they may remain stationary, or increase in size and number during a long series of years. A cicatricial condition of the skin persists after their disappearance, except in cases of the most transient and superficial types.

Treatment.—From what has already been said, it will be understood that the treatment of lupus erythematosus is more uncertain in its results than that of most other skin affections. Sometimes, as has been said, a simple stimulating application will effect the prompt disappearance of the disks; at other times, remedy after remedy may be employed without influencing the process to an appreciable extent, and these latter cases are unfortunately exceedingly common.

Internal Treatment.—Treatment by internal medication has rarely proved satisfactory without the aid of external measures, although a certain amount of aid may be obtained by strict attention to hygiene and to the general health. In the forms that are accompanied by much congestion, the latter condition should be combatted by instructing the patient to avoid stimulating articles of food and drink, by careful regulation of the bowels, by attending to any disorders of digestion or menstruation, by regular moderate friction of the body, and perhaps by the use of hot mustard foot baths. Brocq attaches great importance to internal treatment in these intensely congested cases, and gives ergotine, belladonna, quinine, and digitalis with good results. Cod-liver oil has been much used, and in cases where there is a manifest impairment of nutrition may produce a favorable effect. The iodide of starch has been recommended by McCall Anderson, arsenic by Hutchinson, and iodoform by Besnier. It is doubtful if they have any particular influence on the disease. Iron and tonics generally may often aid by their improvement of the general nutrition.

External Treatment.—In a general way, we obtain our best results from the use of stimulating applications. Nevertheless, caution should be used at the outset, as many cases, especially those that present an excessive congestion, will become violently inflamed by the employment of energetic treatment. Soothing, antiphlogistic treatment will be of service at the outset in these cases, and the various soothing lotions, as well as cold cream, pastes of zinc oxide, starch, and vaseline, will prove useful.

If the inflammation is not pronounced, we may begin cautiously to employ the various stimulating applications that have been found to be of service in this disease, making use at first of the milder ones. Sapo viridis has perhaps enjoyed a greater amount of favor than any other topical remedy, and it is usually mentioned first in the list. It may be used in the form of the spiritus saponatus kalinus, 2 parts of sapo viridis dissolved in 1 part of alcohol. The patch is vigorously rubbed with this preparation, which removes the fatty crusts and exposes the dilated follicular mouths, and causes a mild grade of inflammation. The resulting crust is then dressed with an indifferent ointment or paste until it has fallen, when the soaping may be renewed. By continued application of the liquid soap the disks are oftentimes made to disappear in a few weeks. Another method of applying the soap is by spreading it thickly on a flannel cloth, binding it on the affected part, and allowing it to remain until a certain amount of inflammation has resulted, when the plaster is removed and the skin treated by a soothing application.

In many instances, however, sapo viridis will not be well borne, will seem to do harm rather than good, and in these cases its use should not be persisted in.

Almost all the stimulating and caustic chemical substances known to dermatology have been employed in the treatment of lupus erythematosus, and almost all are sometimes successful. None are specific. In default of a more scientific basis of treatment, these substances should be tried one after the other. Oftentimes the disease will be modified by a remedy that has at a previous time produced not the slightest effect. In view of the superficial nature of the trouble, and the fact that in the greater number of instances no serious after-effects occur, care should be taken to employ no treatment that will be followed by a scar more disfiguring than the original trouble. Sulphur and tar are often of value, especially the former. It may be used suspended in water or alcohol, or in the form of an ointment or paste. A combination of sulphur with salicylic acid, five to ten per cent of each in vaseline or lard, will be of value in some cases. Brocq considers salicylic and pyrogallic acids next in value to sapo viridis, and uses them in the following form:

Acid. salicyl.	1 gramme.
Acid. pyrogall.	2 "
Vaseline	20 "

Or else these substances are incorporated in collodion, which intensifies the effect. It should always be remembered, in employing pyrogallic acid, that it is not an indifferent remedy, and its action should be carefully controlled. Mercurial plaster, worn over the affected areas, will at times effect a complete cure, and has been highly praised by Kaposi. Other mercurial preparations, usually in the form of ointment, may be tried, as white precipitate and calomel ointments. Almost all the stimulating agents that are used in acne are occasionally of benefit in lupus erythematosus, and should be tried in rotation. Other things that may be used are chrysarobin, naphthol, iodide of sulphur, iodized glycerin, resorcin, ichthyol, etc. From time to time soothing applications will be necessary to counteract the excessive inflammation that the stimulating remedies may produce.

If the milder agents that have been enumerated prove ineffective after a thorough trial, and if the plaques are thickened and cretaceous, without marked inflammatory appearance, recourse may be had to more radical measures. The strong chemical caustics, as nitric, sulphuric, and chromic acids, and chloride of zinc, have not stood the test of experience, and have been practically abandoned. Scarifications, according to the method described under tuberculosis of the skin, are often resorted to, especially in France. They are best suited to the more vascular types. In the superficial forms the incisions should not be deep. The after-treatment consists in the application of mercurial plasters, or, if these are not well borne, of simple soothing ointments and powders.

The *thermocautery* has been used with success, but does not enjoy a high degree of favor. Besnier rejects absolutely the thermocautery, and prefers to dot and scarify the lesion with the galvanocautery. It is necessary to extend the incisions well beyond the borders of the lesions in order to prevent their extension.

Curetting the plaques with the sharp spoon may be practiced, the wound dressed antiseptically, and afterward nitrate of silver in crayon form employed to regulate the cicatrization. Besnier practices a preliminary curetting, followed immediately by cauterization with pure lactic acid.

Electrolysis has been found of benefit, the needle connected with the negative pole of the battery being passed in various directions through the lesions. It has not, however, attained a widespread use.

LEPROSY. (Prince A. Morrow.)

Deriv., Gr., λεπρός, scaly.

Synonyms: Lepra; Elephantiasis Græcorum; Leontiasis; Satyriasis; Fr., La Lèpre; Ger., Der Aussatz; Norweg., Spedalskhed.

Definition.—Leprosy is a chronic, infectious disease caused by the *bacillus lepræ*, characterized by pigment changes in the skin, and the production of neoplasms containing bacilli in the cutaneous and mucous surfaces, around the nerves, in the lymphatic ganglia, and in certain viscera, which undergo degenerative changes, with the supervention of a profound cachexia which leads to a fatal termination.

History.—Leprosy has been characterized as the most ancient and most exclusively human of all diseases. Records of its existence in Oriental countries date back from the remotest historical times; its origin is unknown.

While leprosy has always been endemic in certain countries, its history has been marked by periods of recrudescence and decrease. Its spread from one country to another can always be traced to its importation by leprous persons; and its disappearance has, as a rule, been in direct ratio to the improvement in the social and hygienic conditions of the people and the measures taken to prevent the contact of the afflicted with the healthy. In the second century leprosy gained a foothold in Italy, and as early as the eighth century it had become disseminated throughout Europe. In the twelfth century the number of lazar houses for the reception of lepers was two thousand in France alone, and the whole number in Europe was estimated at no fewer than nineteen thousand. In the fifteenth century the prevalence of leprosy in Europe began to decline, and by the end of the seventeenth century it had become practically extinct. Within the present century signs of the recrudescence of leprosy have been manifest by its increased activity and invasion of new territory where it has never before been known.

While the decrease of leprosy is doubtless favored by the conditions above mentioned, observation shows that it has diminished in countries where segregation is not practiced and the habits and surroundings of the people remain unchanged. This spontaneous decadence must depend upon conditions inherent in the disease itself. The history of leprosy offers no exception to the demographic effects of other infectious diseases introduced into a virgin soil. In countries where syphilis has long existed it is a comparatively mild disease; when imported into a country previously exempt, it is apt to be exceptionally malignant. Leprosy introduced into a new stock, where the conditions are favorable to its development, displays a virulence and fatality unknown in countries where it has long existed. At first the more virulent tubercular form predominates, but under the attenuating influence of acclimatization or other favorable factors there is a gradual change in the type of the disease—a progressive enfeeblement of its virulence, as shown in a transition to the milder anæsthetic form, which, as it furnishes fewer bacilli, is less contagious, and the disease diminishes or dies out from the lack of seed for its propagation. This modification of type has been observed in India, Mexico, and other countries where leprosy has long been endemic; it has also been exemplified in the present epidemic of leprosy in the Sandwich Islands.* When the disease was first introduced almost all the cases were tubercular, and rapidly fatal. At the present time, as I am informed by the superintendent of the leper settlement at Molokai (1893), the proportion of the anæsthetic form is much greater than the tubercular form.

Geographical Distribution.—Leprosy has, at the present day, a quite extensive distribution; it prevails probably over one fourth the habitable surface of the globe. It exists in India, China, Japan, the Philippine Islands, Madagascar, Siam, Borneo, Africa, Mauritius, Egypt, Palestine, Turkey, the Grecian Archipelago, and along the Mediterranean ports; in France, Spain, Portugal, Norway, Russia, Iceland, and other parts of Europe. It is found in the West Indies, Central and South America, the United States, Mexico, the Hawaiian Islands, New Zealand, New Caledonia, and Australia. In Europe, the most important center of the disease at the present time is in Norway. In North America, the principal leprous centers are located in New Brunswick, in the Dominion of Canada; in the United States, in Louisiana and Key West, among the Scandinavian colonies of Minnesota, Iowa, and Wisconsin, and in California. Scattered cases have been observed in Colorado, Texas, Oregon, and Utah, and in South Carolina and Florida. In addition, sporadic cases are met with in almost all our large centers of population, New York, Paris, London, etc. Within the past five years I have seen no fewer than twenty lepers in New York, many of whom have come here to seek professional advice.

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* The development of leprosy in the Sandwich Islands affords, perhaps, the best opportunity for the study of the disease of any leprous center in the world. The disease is of comparatively recent introduction, and the influence of contagion, of heredity, of racial peculiarities, and of certain conditions which have contributed to its rapid spread, may be traced with precision. As the writer's views are based largely upon his observations of the disease in that country, frequent reference will be made to them in this article.

Clinical Forms.—The bacilli of leprosy, like the germs of other specific diseases, when they have gained access to the organism, affect particular structures, and spread from one organ to another along certain definite tracts, producing changes in the tissues which are characteristic and peculiar to the morbid process. These changes consist of diffuse or circumscribed infiltrations, and, according to the localization of the lesions in the integument or in the nerves, two principal forms are recognized. Where there is a determination of the morbid process toward the cutaneous and mucous surfaces in the shape of macules and nodules, the term *tubercular* or *tegumentary* is applied; when it is centered upon the peripheral nerves it is termed *anæsthetic*, *trophoneurotic* or *nerve leprosy*. These two forms, although etiologically identical, exhibit marked differences in their external characters, mode of evolution, course, and termination. In tubercular leprosy the predominating lesions are nodular infiltrations in the skin and mucous membranes and other organs; its course is more rapid, and the average duration of life is from five to fifteen years. Anæsthetic leprosy is characterized by changes in the nerves, anæsthesia, ulceration, and gangrene of the extremities; its course is slower, and the duration of life may be prolonged to fifteen or twenty years or longer.

That this division is to a certain extent arbitrary is evident from the fact that the typical features of both forms may coexist in the same individual, thus establishing their essential unity. In a certain proportion of cases there is a combination of both forms, the lesions peculiar to the one or the other predominating, and constituting what is termed the *mixed type of leprosy*.

Symptomatology.—While leprosy is not sufficiently regular in its evolution to admit of its division into distinct stages, it is usual to describe a period of incubation, a period of prodromata, a period during which the various lesions reach their histological acme, and still a fourth, during which the clinical symptoms constantly increase in intensity, owing to the continued degeneration of the tissues and the diminished vitality of the organism, damaged as it is by the multiplication of the bacilli and their toxic emanations, as well as by the absorption of the products of suppuration.

Period of Incubation.—Like all infectious diseases, leprosy has a well-marked period of incubation. The moment of contagious contact is indeterminable, since there is, so far as we can determine, *no initial lesion* of the integument. It is probable that in the mucous surfaces of the upper air passages, the pharyngeal or the pituitary membrane or other port of entrance of the virus, there may be an initial patch which serves as an incubating medium for the bacilli before they become more generally diffused through the system. This view is quite in consonance with our knowledge of the modes of infection in glanders, tuberculosis, and other bacillary diseases. But there is no evidence whatever to show that leprosy has a primary lesion of the external parts which corresponds in any way to the initial lesion of syphilis.

The fact that the first visible manifestations of the disease almost always occur upon exposed parts has led to the opinion that these erythematous spots represent the initial lesion from which, as infective centers, the germs are distributed. This view is evidently erroneous, since, in cases where the date of infection can be fixed with approximate certainty, the spots may not appear for years later, during which period other evidences of systemic infection are unmistakably present. In anæsthetic leprosy their presence is by no means an invariable feature, and they may even fail altogether. It is quite probable that the erythematous spots are the consequence of changes in the peripheral nerves, which invariably precede their development, and are always consecutive to a generalized infection.

Blanc says, "If leprosy may be introduced through the integument, the initial lesion must be an ill-defined erythematous spot, soon followed by other macules in the vicinity or any other part of the body." He asserts that this sort of history was received from a number of his patients, and that he witnessed it in one case, that of an English-born nurse who had charge for several months of a severe case of leprosy. The first lesion appeared one week after a cut from a razor while shaving himself in the ward. Arning reports the case of a young lady who came from a nonleprous part of the United States to Honolulu. Three months after her arrival she noticed a small, red, slightly raised spot on the left forearm, which slowly enlarged and in a year became anæsthetic. Two years later a group of papules, the size of a fifty-cent piece, developed around it. Lepra bacilli were abundantly found in the tissue. This Arning regards as a primary localization of the lepra virus in the skin.

The only case which I find among my notes that would seem to be of a positive character is that of a gentleman who passed a short time in Honolulu. While returning on the steamer, within a week or ten days after any possible exposure, he noticed a "blisterlike" pimple on the side of his neck, which soon ruptured, discharging a thin fluid. It healed up, and he thought nothing more of it. Ten months later he consulted me for a pemphigoid eruption on the lower limbs, the lesions of which he declared to be precisely similar to the one on his neck. I had no suspicion of the leprous character of this eruption at the time, but the subsequent development of unmistakable symptoms left no doubt upon this point. The observation of thousands of cases of leprosy in which neither the patient nor the physician has recognized a lesion of the integument as the point of entrance of the virus, is convincing evidence that it does not *habitually* exist, probably because inoculation through the skin is of rare occurrence.

After the bacilli have gained entrance to the system there is no evidence of the fact during a period more or less prolonged. The absence of any initial lesion renders it impossible to establish the duration of this period within well-defined limits. It has been variously estimated at from a few weeks or months to three, five, ten, or even twenty years and longer. These estimates are based, for the most part, on the observation of persons, previously healthy and without leprous antecedents, who have passed a certain time in leprous countries, and who have developed the first symptoms of the disease months or years after their return. Unless the duration of their stay has been very brief, or they can fix definitely upon the exact time and circumstances of their exposure, it is evident that such calculation is open to error. Thus, recently I have been consulted by a patient who lived eight years in South America without any known exposure. In such a case it is not possible to determine whether the infection was received soon after he went there or immediately previous to his leaving. In another case under my observation, a patient who had spent two weeks in the Sandwich Islands presented undoubted symptoms of leprosy within ten months. Bidenkap reports a case of a patient who developed leprous symptoms within a few weeks after his first exposure. Daniellsen, Boeck, Leloir, and others report cases in which the period of incubation varied from ten to forty years. In almost all these cases of prolonged incubation the patient removed from the leprous district to a country where the disease was not endemic. The length of this period is not determined solely by the specific poison, but depends upon conditions of individual receptivity and other causes, and, as is the case in other infectious diseases, the slower the action of the pathogenetic factor, the more liable is this period to be prolonged by extraneous influences.

Among the conditions which contribute to advance or materially retard the date of development of leprous symptoms are the state of the patient's health, climate, food, habits of living, etc. The resistance of the patient's tissues to the bacillary invasion is one of the principal factors in determining the length of the incubating period. It is probable that many cases recorded as examples of prolonged incubation may have had for years symptoms undoubtedly leprous, but of so mild and equivocal a character that their true nature was misinterpreted and referred to rheumatism, syphilis, or some other malady. Again, many persons who suspect, yet fear to know, that they have this dread disease, carefully conceal their condition as long as possible. Besides, it is not to be forgotten that the initial symptoms of leprosy are so variable, uncharacteristic, and absolutely indefinite, that they would never be ascribed to leprosy in any country where the disease was not endemic or there were not decided reasons for suspecting its presence.

Period of Prodromata.—In the majority of cases there are certain prodromal symptoms more or less pronounced, but exceedingly variable in their form and order of development, which precede the outbreak of the eruptive phenomena. The symptoms usually experienced are a feeling of *malaise*, of debility, of mental depression, of drowsiness, and of disinclination to work. Frequently there is pain, more often localized in the extremities, and some alteration in the sensibility, or some motor weakness.

Febrile symptoms, which constitute a more or less constant feature of the prodromic stage of *tubercular leprosy*, are commonly preceded by sensations of chilliness or a well-defined rigor. The fever, which is usually of an intermittent type, has been popularly ascribed to cold, to malaria, etc.; scientifically considered, it is believed to be due to the invasion of new parts of the body by the bacilli and to the toxic effect produced by their emanations. Coincident with the febrile paroxysms there oftentimes exists a very marked degree of prostration. The other symptoms may be either derived from this same cause or be dependent upon the frequent morbid stomachal conditions which, although often described as an effect, are more properly to be considered as a debilitating causal factor.

Leloir considers the frequently described epistaxis to more fitly belong to this prodromal period than to the later one to which it is usually assigned. As a prodromal symptom it would be similar in nature to the epistaxis of typhoid fever, or of incipient tuberculosis. At a later period of leprosy the epistaxis results largely from ulceration of the pituitary membrane. If excessive, the attacks are followed by vertigo. Vertigo and cephalalgia exist not only in the prodromal period, but also in the secondary period, or that of eruption, where frequently the severity of the paroxysms and the nocturnal accentuation recall similar syphilitic conditions. There may be a more or less generalized or merely local irregularity in the sudoriparous glands which may depend purely upon the general weakness, as in tuberculosis, or, appearing as it does most frequently in the anæsthetic forms of leprosy, upon vasomotor disturbances, and be indicative of peripheral nerve lesions, and possibly of central complications (Leloir).

The prodromata of the *anæsthetic form* are more variable in kind and degree and are distinguished by their marked neurotic character, pointing to the more active participation of the nervous system in their production. In the anæsthetic form especially the patients complain of formication and pruritus. The itching, often of a severe character, is, in the writer's opinion, one of the most common and characteristic signs of the invasion period. Some patients can not keep still from the imperious call to rub or scratch the limbs; at night the sensation is not dulled by sleep; they have evidences in the morning in the shape of scratch-marks inflicted unconsciously. Sensations of tingling, burning, or pricking pain may be present. One of my patients described the sensation as that which follows the contact of air or water with a freshly abraded surface. On more than one occasion he removed his shoe, feeling assured that he would find an abrasion from its rubbing the ankle. These sensations are not invariably present, and are more or less intermittent. They are exceedingly capricious in their manifestation—first in one locality, then in another.

The hyperæsthetic symptoms are not confined to the skin, but tenderness and pain of a lancinating, boring character may be felt in the deeper structures, accompanied with sensations of numbness or deadness, and a feeling of stiffness and heaviness, especially of the lower limbs, sometimes interfering with locomotion.

All the above described symptoms vary in intensity and character; they may be so slight as to escape attention, or their significance may not be recognized or rightly interpreted until unmistakable evidences of the disease declare themselves. The prodromal period varies in duration from three to twelve months or longer, and is succeeded by the phenomena of the eruptive stage.

It will be more convenient to study separately the clinical features of the two principal forms of leprosy, since the determination of the morbid process to the tegumentary system in the one form and to the nervous system in the other gives rise to such a diversity of manifestations that the clinical pictures presented by each are entirely distinct.

TUBERCULAR LEPROSY.

Eruptive Stage.—The first cutaneous manifestations of the tubercular form consist of an eruption of round or irregularly shaped spots of a brownish or mahogany-red or sepia tint, or sometimes of an ecchymotic appearance. The coloration depends upon the complexion and race of the individual. In white races it is of a lighter, more crimson color on its first appearance, and it afterward deepens into an orange or purplish shade. The spots are of variable size—from that of a small coin to that of the hand; they appear slightly elevated, distinctly defined, more pigmented in the center, and somewhat hyperæsthetic. The skin, especially when they are situated on the face, appears slightly thickened and swoll-

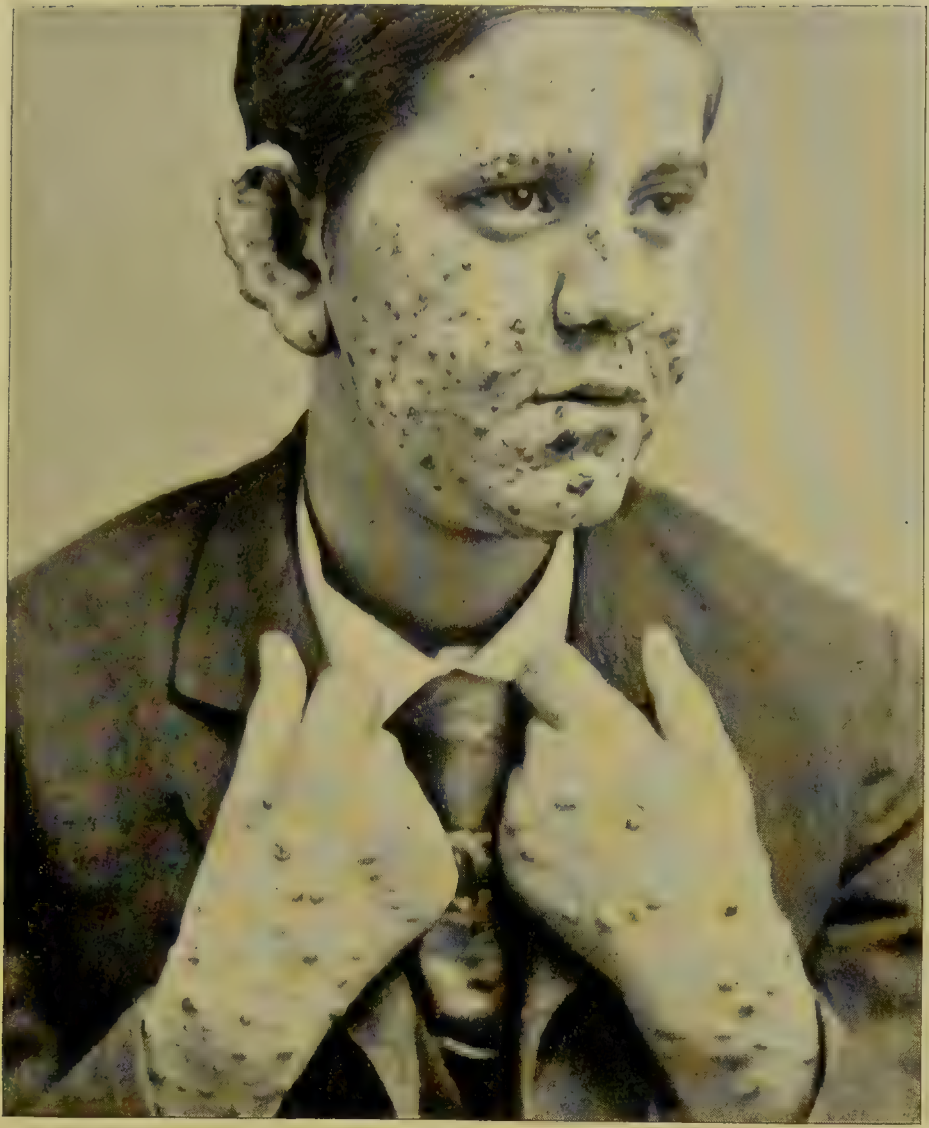

FIG. 1.—TUBERCULAR LEPROSY (early stage).

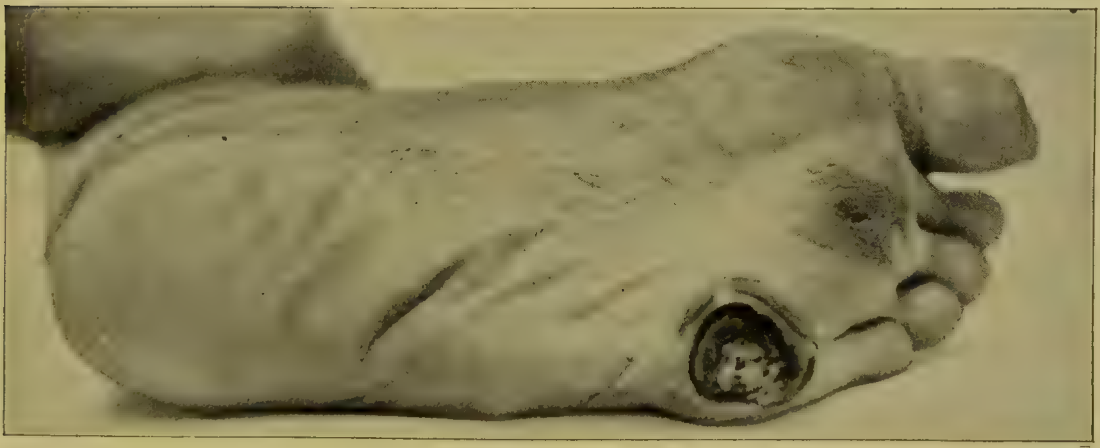

FIG. 2.—PLANTAR ULCER.

(From the author's Hawaiian collection.)

en. These spots are, as a rule, not permanent; they may appear and disappear a number of times before the characteristic tubercular changes develop, without leaving any trace of their previous existence.

After a time the pigmented patches, instead of undergoing involution, remain persistent and become the seat of tubercular infiltrations, which occur in the form of small, pea-sized, pinkish or yellowish-brown nodules, which may remain stationary or rapidly enlarge. The tubercles may, however, develop upon new surfaces which have not been the seat of preceding pigment changes. The development of tubercles is almost always preceded by febrile symptoms, and they generally come out in successive crops.

The patient portrayed in Plate XVII, Fig. 1, was recently seen by me in consultation with Dr. C. F. Barber, who has kindly furnished the following notes of the case:

The boy, H—— A——, a native of Key West, Florida, is fourteen years old; has two sisters and a brother, all healthy; mother and father, natives of the West Indies, both enjoy good health; one uncle has been a sufferer from a chronic skin affection for a number of years, said to be an eczema. Four years ago he had an attack of measles. Upon regaining his health, it was observed that he had a "rash," which did not fade, as was anticipated the skin trouble would. His general health, however, seemed good, but during the hot weather his skin would assume a peculiar hue, and in places small elevations would appear, all fading when a cool day came. From what I have been able to glean, the boy had been most thoroughly treated for syphilis; he has been to school, and led his usual life until last fall (1893); he was sent to New York for advice as to the nature of his ailment. At the time I first saw him his condition was about as follows: Skin sallow; tongue coated: pulse not as full and strong as one would expect to find in a boy of his age—accounted for when his heart was listened to, as that organ was weak, but no murmurs could be found. His appetite was poor, meat being sought for and vegetables avoided by him. He could not stand any fatigue—viz., unable to walk any distance or endure any laborious tasks. The tubercles, more prominent on the face than elsewhere, were also present on his extremities. His body was free from these neoplasms, but there were areas which seemed to have lost the pigmentation, or the pigment was increased in some places and faded in others. No anæsthetic areas could be found. In his mouth, extending from midway of the hard palate to well on the soft part of the palate, was an ulceration, with elevated borders. It was probably one and a half inch in length by half to three quarters of an inch wide. He complained of no pain or inconvenience from this lesion, which improved greatly after he was placed upon nux vomica. An ulcerated condition existed on his right foot, just back of the great toe; also a spot on the inner side of each thigh. The ulceration on the foot healed kindly, but when last seen the two other ulcers were far from healing.

As the leprous deposits occur in the skin the latter thickens and becomes elevated into flat or spherical prominences with well-defined outlines, which are, as a rule, sharply distinct from each other, or they may become confluent and constitute large plaques which may cover the entire surface of a limb. The tubercles may be dermic or hypodermic in their situation. They vary in size from that of a pea to that of a walnut or larger, and by their aggregation form masses of considerable size. In shape they may be rounded or oblong, flat or prominent; they are usually of soft consistence, and of a yellowish or brownish-red color. They are found on every part of the body except the scalp, and very rarely on the glans penis,* palms, and soles; the regions most affected are the forehead, nose, lips, chin, cheeks, and ears, the anterior aspect of forearms and hands, and the outside of thighs. The most marked and characteristic development of tubercles occurs upon the face (Fig. 46). In an advanced stage the integument of the forehead becomes infiltrated with tubercular nodules or masses divided by furrows, corresponding to the natural lines of the skin; the cheeks, especially over the malar prominences, enormously tumefied and uneven with tubercles; the lips swollen and everted; the alæ of the nose thickened and broadened, with flattening or sinking in of the bones of the nose, giving it a crushed appearance; the protuberant, nodular ears; the lobes hanging down in a flabby, pendulous mass; the conjunctival

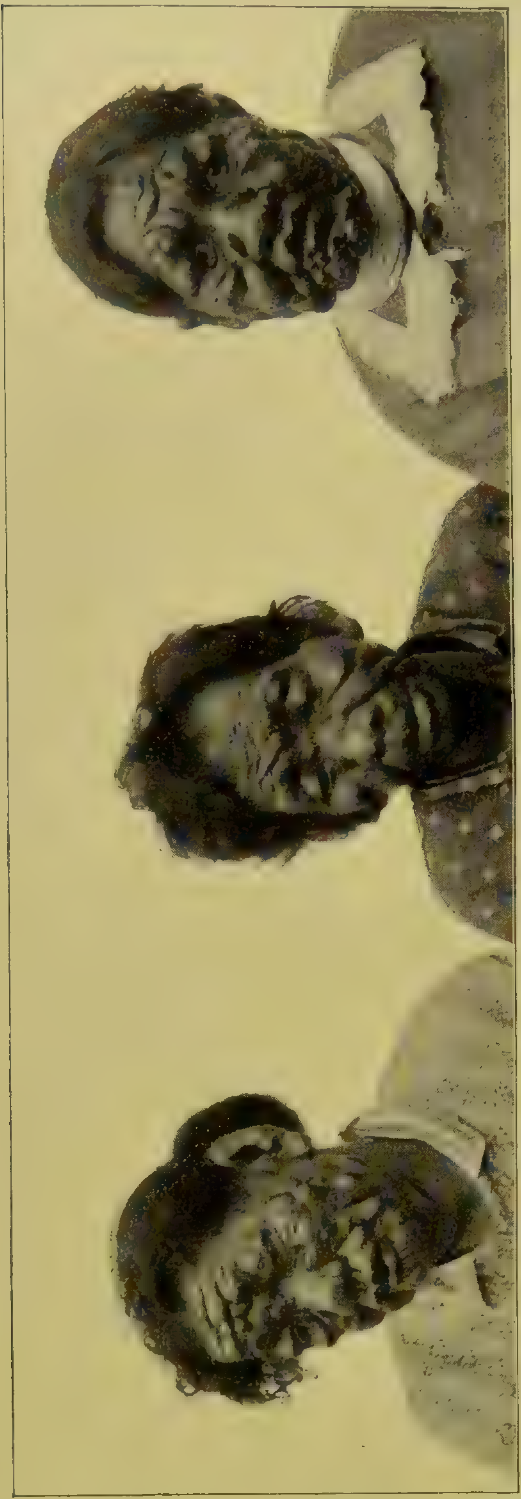

Fig. 46.—Tubercular leprosy (mother and two daughters). (From author's Hawaiian collection.)

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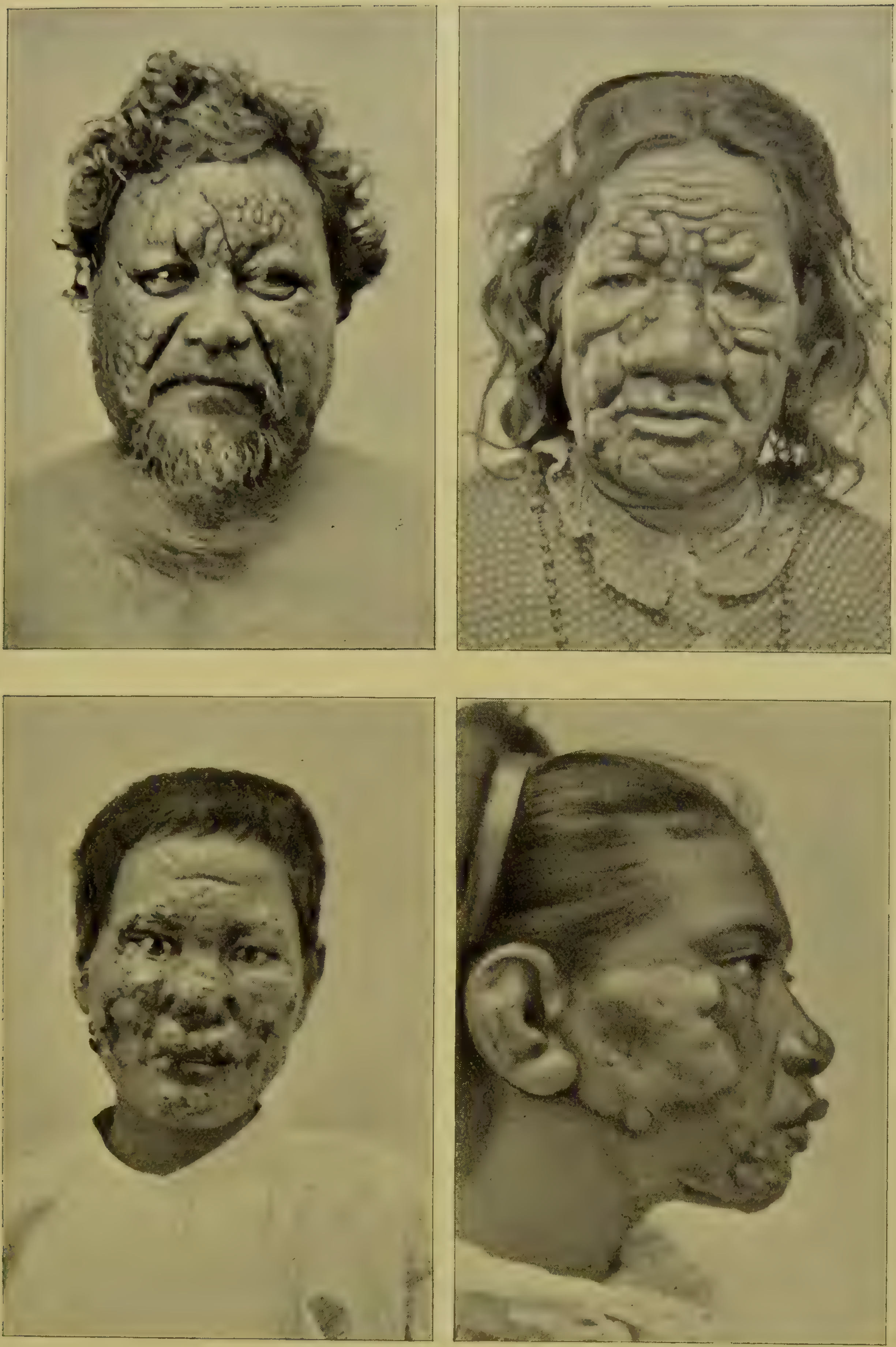
* Most authorities affirm that tubercles never occur upon the glans penis. I have a photograph of a Chinaman whom I examined in San Francisco, showing characteristic tubercles on the glans.

PLATE XVIII.



Typical Facies of Tubercular Leprosy.

(From the author's Hawaiian collection.)

and corneal lesions; the loss of the eyebrows and lashes—are elements in a picture of hideous deformity, which once seen can always be recognized as pathognomonic.

The course of the tubercles and diffuse infiltrations may remain stationary and practically unchanged for months or years, the surface desquamating slightly, and the color changing into a coppery dark brown or livid tint. They may undergo gradual resorption, leaving pigmented stains or cicatrices. The disappearance of one crop is succeeded by another, in the same or in new regions, at variable intervals; or they may undergo fibrous induration and become transformed into small masses, which persist indefinitely without further change, or keloidal changes may occur.

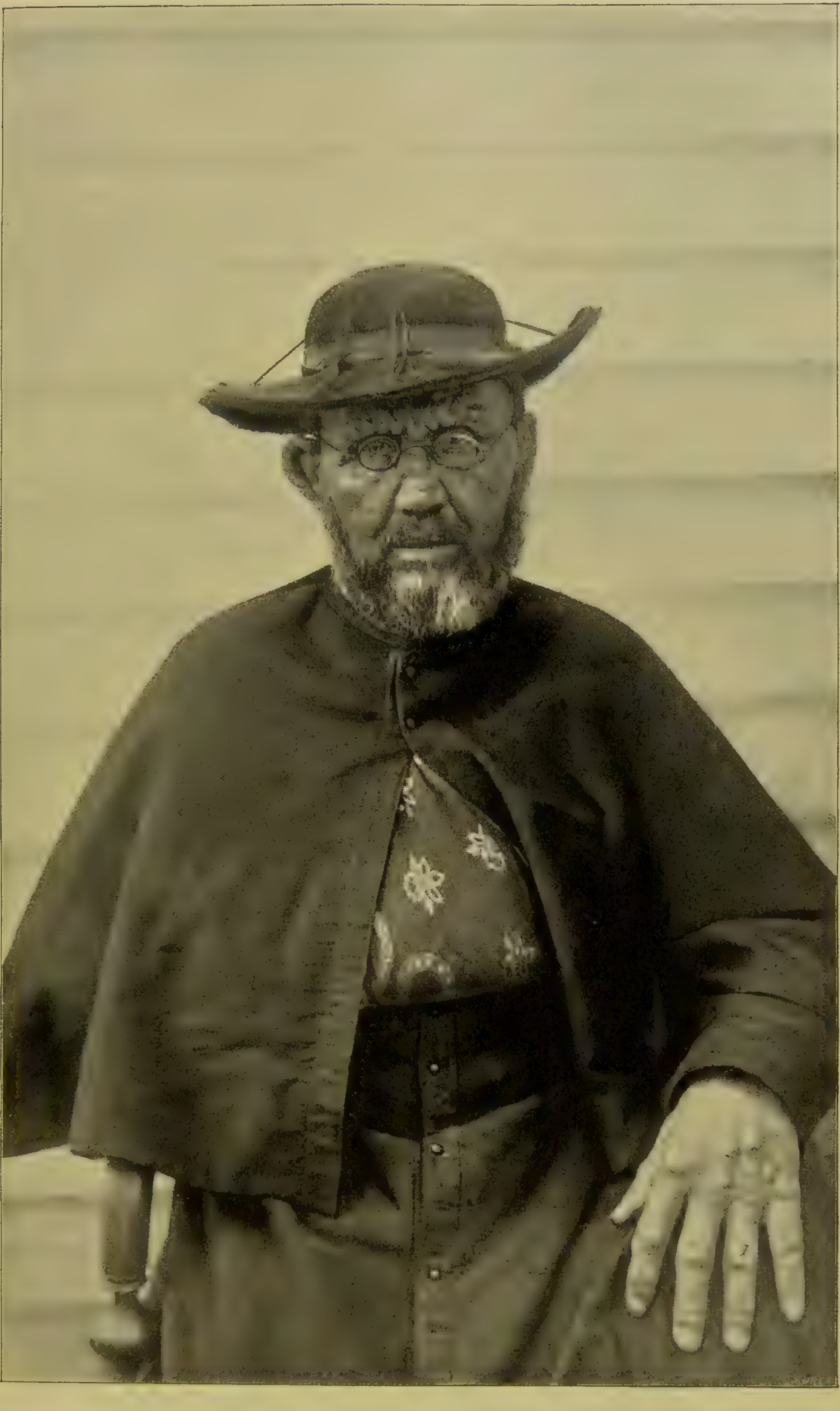
Ulcerative Stage.—Instead of being resorbed, the tubercles may soften, disintegrate, and break down, forming shallow, indolent ulcers, which secrete a yellowish-brown, viscid fluid, which sometimes concretes into thick crusts. Tubercles on the extremities are more apt to break down into ulcerative lesions. Ulcers may heal spontaneously, or more rapidly under the influence of antiseptic dressings and strapping. The ulcerations are oftentimes extensive, both in area and depth; they may take on gangrenous action and cause profound loss of tissue, sometimes plowing up the soft tissues and laying bare the ligaments and bones. They sometimes encircle an extremity, involving the entire limb. During the progress of the disease the glands in the groin, axillæ, and neck become painful, swollen, and later the seat of suppurative adenitis. Swelling of the lymphatic vessels leading to the glands also occurs.

The chief interest of the following notes of Father Damien's case, taken, as was the accompanying portrait (Plate XIX), about one month before he died, attaches rather to the personality of the patient than to the clinical features recorded. They are given in his own language:

Tubercular Leprosy.—Rev. Father Damien de Veuster, Catholic priest, native of Belgium; Belgian parents; forty-nine years of age. All the members of his family very strong and healthy. No taint of scrofula or syphilis. No relatives on these islands. Served as priest on the Island of Hawaii from 1864 until 1873. Occasionally heard confessions of lepers; ministered to them in their cabins sometimes, but had no constant or very particular contact with them until he came here, to the leper settlement, in 1873; since which time, until now, his contact and association have been almost constant. In 1873 was strong and healthy, with remarkably robust constitution. Has never had any sexual intercourse whatever. Is quite sure that, when near to lepers, as at confession, or in their cabins, before coming to the leper settlement, he felt on each occasion a peculiar sensation in the face, a sort of itching or burning, and that he felt the same here, at the settlement, during the first two or three years; is confident that the germs were in his system, certainly within the first three years of his residence here—can trace it back positively to 1876. Small, dry, reddish spots appeared at that time, particularly on the arms—some on the back.

On these spots perspiration did not appear, as elsewhere. Upon treatment with corrosive-sublimate lotion they would disappear, but return again. Finally, in 1877 and 1878, assumed yellowish color and became larger. In 1877 he took sarsaparilla as blood purifier, when the spots became more defined, still yellow; would remain until the lotion was applied. This described the first marks; but earlier still there was a suspicious movement. His feet had a peculiar sensation; were hot and feverish; made him restless; he could not sleep without first giving them a cold-water soak; nor, without doing this, could he keep them covered at night. This was in 1874 and 1875. He continued to enjoy strength and health. In 1877 was vaccinated, at the time of the smallpox epidemic in Honolulu. During a few days he had some fever, and there was inflammation at the point of vaccination, on a space about the size of a silver dollar, some matter flowing therefrom. In the autumn of 1881 he began to be badly troubled with severe pains in the feet, especially in the left one, and in 1882 sciatic nerve trouble came on, clearly defined, all along the left leg. At the close of 1882, or early in 1883, entire insensibility of one side of the left foot —the *outside* portion—took place, and so remains until this day. He was able to draw a line marking division of the sensible from the insensible portion of his foot. This is the only part of his body that has been so attacked. The pain of sciatic nerve and of the *inside* portion of the foot was intense and almost constant, accompanied by formation of nodes in the left groin. All these pains disappeared at once, about June, 1885. Then the right ear became swollen, with tubercular enlargements, making the whole thing an immense affair. At the same time began the disfigurement of his person in a general and marked manner; the eyebrows began tō fall out, the other ear became enlarged, and tubercular swellings took possession of face, hands, etc. The knuckles and knees were hard, enlarged knobs, becoming suppurating sores; many sores on the hands and wrists, some about the neck, eyes weak and at times very much inflamed; nose greatly obstructed, causing much distress during the past two years; appearing as catarrh; the bridge of nose much sunken. The foot that was partly insensible was for a long time exceedingly weak. Now, since the disease has spread over the body, it has become strong again.—*(Signed)* J. DAMIEN DE VEUSTER.

The Mucous Membranes.—Contrary to what is usually taught, I believe that the first manifestations of leprosy are, in the majority of cases, determined toward the mucous membranes of the pharynx and upper air-passages. Few of our modern authorities seem to recognize the precocity of these manifestations, although Hillis remarks that in tubercular leprosy the first throat symptoms occur during the febrile attack. According to my observation, alteration of the voice betrayed by a slightly husky or rough phonation, rhinitis, with an abnormally free nasal secretion, sometimes epistaxis, and an increase in the salivary secretion, are among the earliest signs of leprosy. The significance of this change in the quality of the voice was known in the time of Moses; the priest recognized the leprous by commanding them "to speak before him." At a more advanced stage, when there are leprous deposits in the mucous surfaces, with involvement of the cartilages and bones, the characteristic harsh,



Portrait of Father Damien.

(From the author's Hawaiian collection.)

raucous voice and the difficult, sniffling respiration, from obstruction of the nostrils, are almost invariable concomitants.

A patient in the early stage of anæsthetic leprosy under my observation can not go from a warm room into the cold air without liability to a copious nasal secretion, compelling her to use a handkerchief almost continually. There are no visible leprous changes in the nose, and the phenomenon is probably due to the action of the bacilli upon the vasomotor nerves of the pituitary membrane, robbing it of its protective power, so that it responds to the action of the cold air by an abnormal secretion. The increased salivary secretion is doubtless caused by reflex irritation of the salivary glands. According to Hillis, coincidently with the appearance of tubercles on the surface, the mucous membranes of the mouth, the pillars of the fauces, the uvula, and the tongue, are studded with pinhead-sized red papules (Fig. 47). The epiglottis becomes enlarged from infiltration of the submucous tissue. The vocal cords and other structures of the larynx become the seat of infiltrations and ulcerative processes. Tubercles also form in the nasal fossæ, especially upon the septum, which ulcerate, leading to destruction of the cartilaginous and osseous framework, and the characteristic flattening or sinking in of the organ.

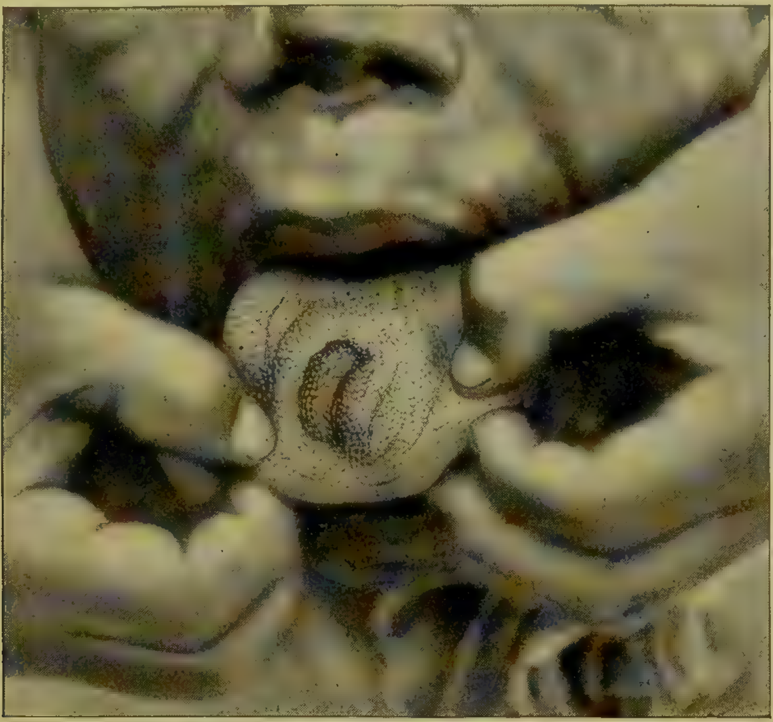


FIG. 47.—Tongue lesions of tubercular leprosy, showing fissures and miliary tubercles. (From author's Hawaiian collection.)

The mucous membranes of the eye become at a comparatively early stage the seat of leprous infiltrations and thickenings. Small, flat, tubercles form upon the conjunctiva and the cornea, and may extend into the anterior chamber, involving also the iris, gradually extinguishing the perception of light, and resulting in total blindness.

A characteristic symptom of the eruptive period is the *alopecia*. The falling out of the hair is, as a rule, confined to the localities affected by the eruption, and is total over the spots and partial in their interval. The first place usually thus distinguished in the tubercular form is the eyebrows, while in the anæsthetic form falling of the eyelashes takes place, doubtless from dystrophia of the hair-follicles. The only pilous part which enjoys a persistent immunity, is the scalp, which exemption is probably due to absence of an eruptive lesion there. The hairs suffer from a pronounced inanition before gradually disappearing, which condition is explicable by what we know of the bacillary depredations on the hair-follicles. If the leprosy is juvenile, the later apparitions of hair—axillary, pubic, and facial—are usually inhibited ; the eyebrows and body hair falling out subsequently, leave the body glabrous. The *nails* are rarely affected, although occasionally their nutrition suffers, and they become thicker or thinner, rugous, perforated, opaque, or disjuncted from their matrix. The *sebaceous* and *sweat* glands are disturbed in their functions at an early period of the disease. There is ordinarily, at first, an increase in their functional activity, which is followed by a diminution or arrest, which may be general or localized in certain areas.

As regards the effect of leprosy upon *sexual desire* and *capacity* there is considerable difference of opinion. The traditional belief in a *satyriasis leprosa* doubtless has some foundation in fact, especially in the early stage of the disease. As the result of inquiries instituted among several hundred lepers at Molokai, the conclusion may be formulated that in the majority of cases sexual desire is increased during the early period of the disease ; at a more advanced stage the testicles atrophy, and sexual desire as well as capacity are impaired or entirely lost, and the subjects become practically impotent. Numerous exceptions were, however, noted to this rule.

Leprosy acquired in early life seems to exert much the same blighting effect upon the physical growth and sexual development as syphilis. Juvenile leprosy is commonly characterized by a retardation of development of the sexual organs and arrest of their functions. Menstruation is deferred or often entirely inhibited if the disease develops before puberty. If leprosy develops after puberty, it causes a disturbance of the menstrual function, the menopause comes on precociously, and the procreative capacity is weakened or entirely lost. Exceptions to this are also to be noted.

As leprosy advances in its evolution all the symptoms increase in in-

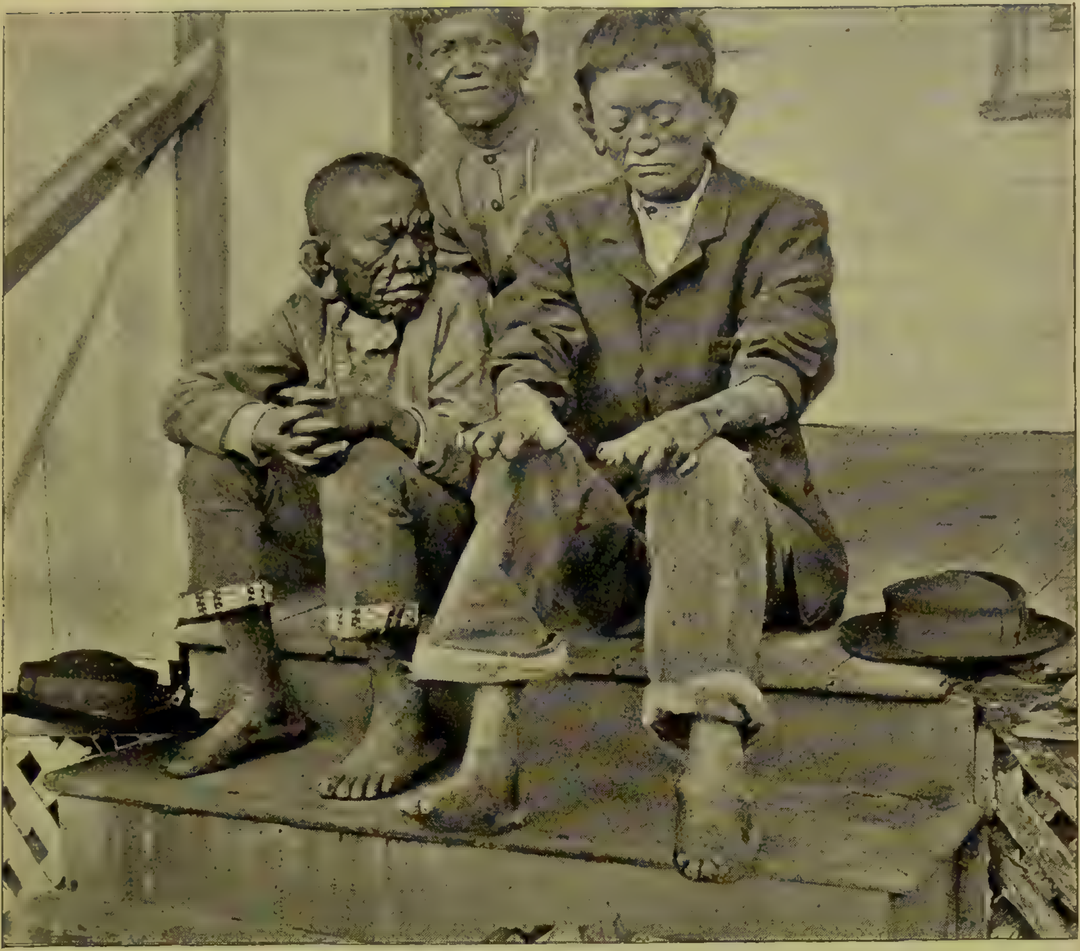


FIG. 48.—Tubercular and anæsthetic leprosy. Contrast between the two types exhibited in face, hands, and feet. (From author's Hawaiian collection.)

tensity and severity. Unless the unfortunate patient is carried off by some intercurrent disease, he may live for years, suffering a slow and progressive decomposition of the body through the breaking down and ulceration of all the tissues and organs invaded by the leprous deposits. The immediate causes of death are usually enteric complications with colliquative diarrhœa, renal disorders resulting in dropsy, pulmonary lesions, or suffocation from œdema of the glottis or stenosis of the larynx or trachea. These complications were formerly regarded as tuberculous in character, but Arning believes that we have been mistaken in attributing deaths of lepers to intercurrent pneumonia, tubercular phthisis, and dysentery, which were simulated by the clinical symptoms. The ulcerations of the bowels and the breaking down of lung tissue are, in his opinion, due to a leprous infiltration, constituting *phthisis leprosa* and *enteritis leprosa.*

ANÆSTHETIC LEPROSY.

The anæsthetic form possesses a physiognomy peculiarly its own: its clinical aspects are so different from those of the tubercular form that it is sometimes difficult to recognize them as expressions of an identical disease, due to the action of the same pathogenetic factor (Fig. 48). The phenomena are essentially those of multiple neuritis, consisting principally of disorders of sensation and nutrition. The period of incubation is usually more prolonged, and the prodromata are distinguished by an absence of febrile symptoms, as a rule, and the more pronounced character of the subjective sensations of hyperæsthesia, pruritus, and pain.

The first *cutaneous manifestations* of nerve leprosy are usually in the form of bullæ or erythematous spots. In two of my cases the formation of bullæ preceded by several months the appearance of any macular lesion. The development of the spots is usually preceded by a sense of formication, burning or stinging sensations. The maculæ are oval or circular in outline, of a bluish-red or reddish-brown color, which may be partially effaced by pressure; later the tint deepens into a brownish-yellow, slaty, or sepia shade, the gradations of color depending largely upon the complexion and race of the individual. The spots are usually persistent, and manifest a tendency to clear up in the center while spreading at the periphery. They are hyperæsthetic upon their first appearance, but as the central portion clears up the hyperæsthesia recedes to the pigmented periphery, and is replaced by anæsthesia of the center. It would seem that in the evolution of these lesions hyperchromia and hyperæsthesia, achromia and anæsthesia are associated, and advance *pari passu*. Instead of undergoing the course of evolution just described, the spots may be *achromic* from the first, without preceding congestion or pigmentation.

The macules may remain discrete, or spreading peripherally form by their confluence gyrate patches with slightly elevated, distinctly defined, reddish margins, and pale, pigmentless atrophic centers (Fig. 49). This process of blanching may extend over large surfaces of the body. The anæsthesia is by no means confined to these spots, but may extend over large areas, or the entire region supplied by a particular nerve.

Analgesia and thermo-anæsthesia may be present with or without impairment of the tactile sense. In a more advanced stage where all the nerve fibers are destroyed, there is a complete abolition of all sensory functions. Most of the cutaneous lesions encountered in nerve leprosy, before the mutilating stage sets in, are due to the blunted sensibility. The deadened nerves give no warning through the perception of pain of the inroads of heat, cold, or other external sources of injury. A patient often receives severe injury, as a scald or burn, unconsciously, or a pin may be thrust into the flesh without causing pain. Sensibility to puncture, however, is variable, not only in different parts of the body but in contiguous spots; the same is true of sensitiveness to temperature. Quinquaud, by means of a very delicate æsthesiometer combined with a dynamometer of his own invention (1890), found that while five grammes in one point would elicit distinct sensation, it would require one hundred grammes, two millimetres distant from the first point, to call forth the same degree of feeling. With regard to temperature, it was sometimes necessary to attain 30° C. before obtaining a sensation; or 0° C. and 10° C. would be contiguous findings. There were frequent phenomena of disassociation. Some patients had no perception of cold, but felt heat, and *vice versa*. These modifications were met with at the earliest period of the disease. There is also slowness in the transmission of sensations (Neisser). I have observed a number of times, in applying electricity to the border of an anæsthetic patch, that a current representing the full strength of fifty elements would pass for a minute or two without evoking any sensation, and then the nerve conductivity would be aroused, betrayed by a sharp sensation of pain, so that the strength of the current would have to be largely reduced to make it bearable.

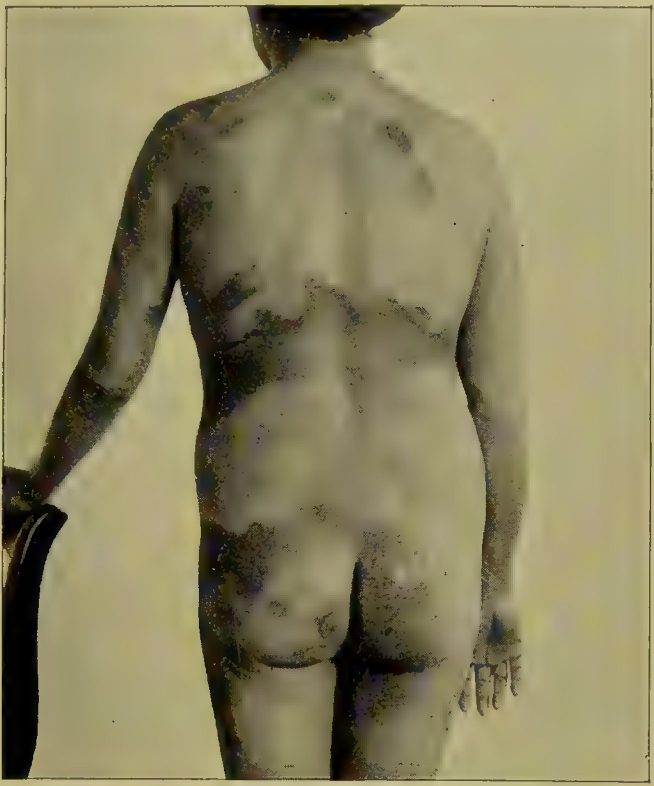


FIG. 49.—Macular lesions of anæsthetic leprosy. (From author's Hawaiian collection.)

Although the most frequent sites of the spots are the legs about the ankles, they may be found on the backs of the arms and shoulders, the elbows, the back, the abdomen, the nates, and the face; they are rarely seen on the palms and soles, and never on the scalp. The eruption is often symmetrical, but would seem to be independent of the distribution of particular nerves. In certain cases the maculæ were disposed along the intercostal nerves, forming a double zona, which was absolutely painless (Leloir).

After their complete development there is a more or less continuous desquamation from the surface of the patches, the hair often becomes white or falls out, and there is complete suppression of the sweat secretion, not only of the anæsthetic patches but of the skin immediately surrounding them, this latter constituting a valuable diagnostic feature. Very often the skin, especially of the hands, becomes thin, shiny, or glossy in appearance from dystrophia.

Many years may pass—possibly eighteen to twenty (Daniellsen)—and the patient, with the exception of an occasional innocuous eruption or neuralgic pains, may have no disorder of sufficient importance to awaken his suspicions as to the exceeding gravity of the disease with which he is afflicted.

Another form of eruptive lesion in anæsthetic leprosy is the pemphigoid. The bullæ are of variable size, containing a clear, yellowish serum; they appear suddenly, often without any sensory symptom; they spontaneously rupture after a few hours, and their flaccid walls may be wiped or brushed away, showing excoriations like superficial burns or scalds, which, upon healing, leave cicatrices or slight pigmented stains. The blebs may succeed one another for several years without being accompanied by any notable disorder other than the neuralgic or rheumatoid pains. The blebs are always located more particularly on the hands and feet, and on the posterior surface of the elbows and the anterior surface of the knees, although they may be found all over the external tegument. "Pemphigus is the appurtenance of *lepra nervorum;* it may occur in the mixed form, and but exceptionally in the tubercular" (Leloir). According to the same author, bullæ also form on the mucous surfaces.

The most characteristic *mucous-membrane symptoms* consist of complete loss of sensibility about the soft palate, uvula, and back of the pharynx, not amounting to paralysis, but seriously interfering with the proper functions of the muscles of the throat affected by it, permitting regurgitation through the nostrils, and causing difficulty in swallowing. The anæsthesia is so great in the parts mentioned that the patients do not wince when a sharp instrument is plunged deeply into the parts (Hillis).

The neuralgic pains, to which reference has several times been made, are preceded and accompanied by sensations of numbness, of hyperæsthesia, etc., and are themselves of a paroxysmal nature. They are particularly nocturnal.

In the invasion of the nervous system the bacilli seem to manifest a predilection for the ulnar and peroneal nerves. The thickening of the ulnar nerve, which may be often felt behind the olecranon, giving the sensation of a tense cord rolling beneath the fingers, constitutes one of the earliest and most valuable signs of nerve leprosy. In doubtful cases, where other symptoms are equivocal, its presence furnishes the necessary confirmation of the diagnosis. The thickening may be fusiform, or more nodular or moniliform, and the nerve may attain the size of the little finger. It is sensitive to the touch, and, when compressed, pains may be felt radiating along its course to the fingers. At a later stage, when tissue degeneration sets in, there is a diminution in its size and sensitiveness. A similar enlargement may affect the tibial, median, radial, and other nerve trunks.

Paralysis of certain nerves with atrophy of the muscular tissues they supply, and tendinous retractions, giving rise to various deformities, are also pathognomonic features of nerve leprosy. Paralysis is characteristically displayed in the regions supplied by certain cranial nerves. The lower lid may become pendulous and everted, rendering it impossible to close the eyes. The paralysis may affect the facial muscles, drawing the face to one side, and constituting a characteristic deformity. In cases where the control of the eyelids is lost from paralysis of the muscles and the eyes not protected, inflammation and ulceration, with opacities of the cornea, are apt to occur. The eyes are also liable to be injured from exposure to a bright light, the wind, particles of dust, and other irritants, from the loss of protection by the eyelashes.

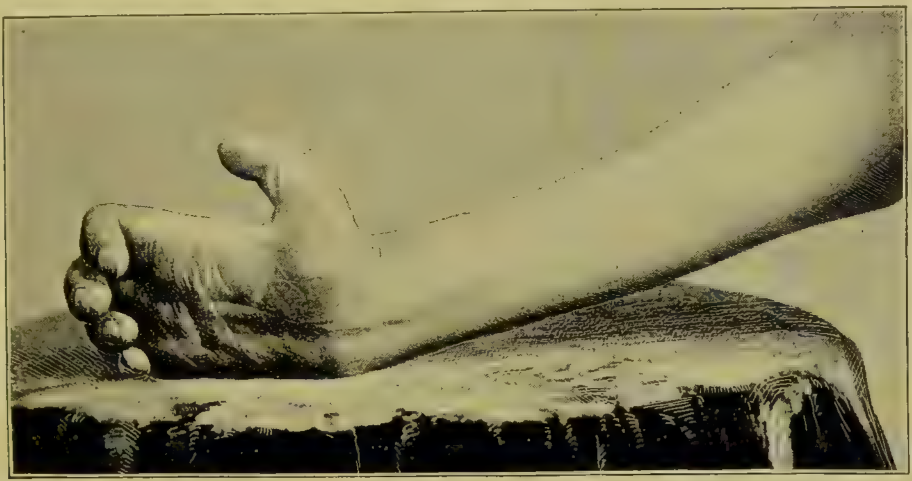


FIG. 50.—Anæsthetic leprosy, showing characteristic "leper claw." (From the author's Hawaiian collection.)

Among the induced changes is that of muscular atrophy, accompanied by fibrillary contractions and marked diminution, ending in abolition of the electric excitability (Charcot). The dynamometer shows a marked diminution in the muscular contractility. As the motor fibers are destroyed proportionately to the muscular atrophy, we have paresis and not paralysis as a resultant (Eisenlohr). Whether this is due to a lesion of the trophic fiber of the nerve or to loss of their functions by motor lesion is not known. In any case, a pure motor paralysis is not met with in leprosy unaccompanied by lesions of the sensitive and trophic systems. The muscular atrophy and tendinous retractions lead to conditions and deformations identical in appearance to those resulting from idiopathic nervous diseases. Commencing with the thenar eminence, the atrophy embraces the other muscles of the hand, particularly the interossei, and then extends to those of the forearm and arm, including the deltoids and the pectorals. The hands become claw-shaped, from the tendinous contractions (Fig. 50). The little finger is usually the first affected. In the production of the "leper claw" the proximal phalanx always bends backward, while the middle and distal phalanges are curved inward toward the flexor side (Fig. 51). These changes are often accompanied with atrophy and loss of sensation, with various trophic lesions. Pemphigus blebs locate on the phalangeal articulations, and ulcerate, uncovering the deeper tissues, whose consecutive disease leads to the elimination of the bone and to the extensive mutilations which characterize this period of leprosy (Fig. 52).

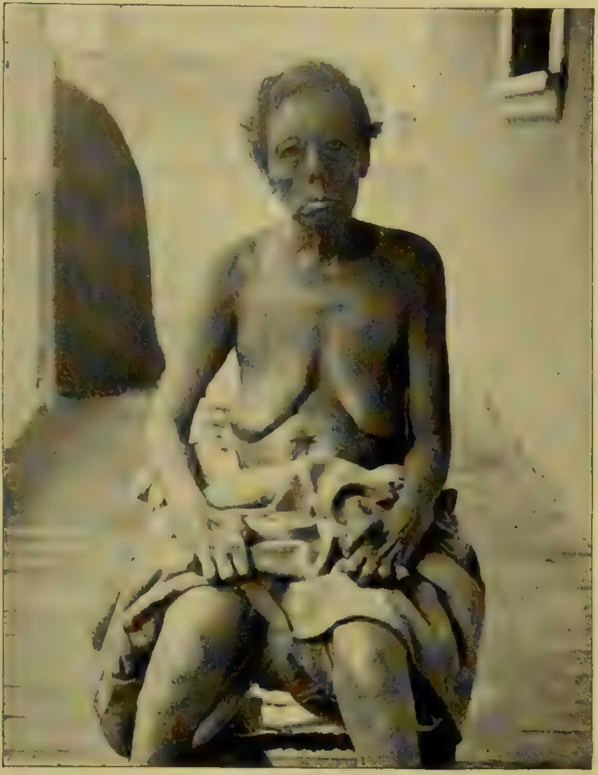


FIG. 51.—Anæsthetic leprosy, showing marked muscular atrophy, paralysis of facial muscles, and "bird-claw" contraction of fingers. (From author's Hawaiian collection.)

Similar processes produce like deformities of the foot and leg, giving rise to the so-called paralytic club-foot, complicated by the already described mutilations. One of the most characteristic lesions is the so-called *plantar ulcer* (Fig. 2, Plate XVII), which is especially liable to occur in patients who habitually go barefoot. The ulceration is deep, often extending to the bone.

Owing to the atrophy of the glandular system, and the suppression of the sweaty and oily exudations, the skin dries up, wrinkles, and cracks, producing fissures, which may be the seat of perforating ulceration. The mutilations may also be the result of spontaneous resorption (rarefying osteitis), giving rise to what might fitly be termed leprous osteomalacia

(Léjune). The bones of the fingers and toes may be lost without ulceration by a process of osseous absorption affecting one phalanx after another, or the phalanges may become the seat of gangrene, which extends until a mark of demarcation is found and the member is spontaneously amputated (Figs. 53 and 54). The reparative process is usually prompt and complete, the stump healing perfectly. When the loss of the phalanges is only partial, the stumps may stand out at every conceivable angle, and often in the most distorted and grotesque positions. The nails suffer in their nutrition, but present such a wonderful degree of resistance that we may find in them the only reminder of fingers that have completely disappeared, and seated on the centrifugal end of the metacarpal bones.

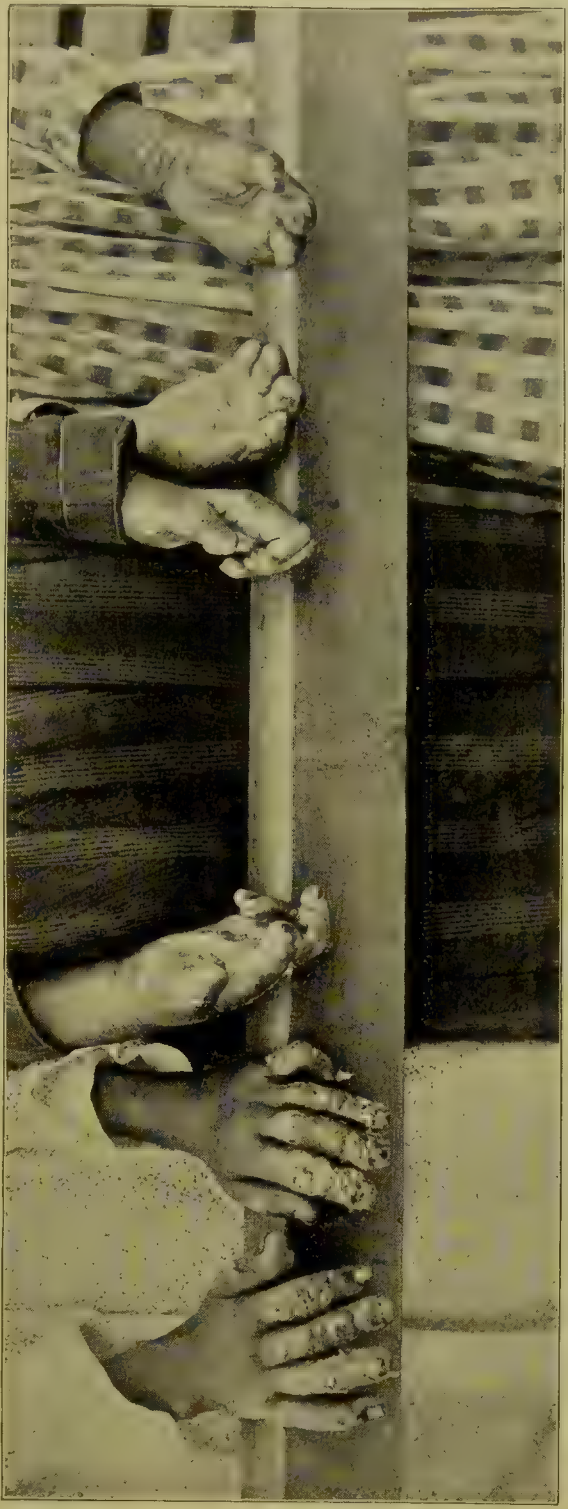


Fig. 52.—Anæsthetic leprosy, showing different stages of mutilation. (From author's Hawaiian collection.)

The effect of nerve leprosy upon the sexual functions appears to be less marked than that of the tubercular form. In many cases it would appear that the sexual organs are at first stimulated, and the extinguishment of desire takes place more gradually, and only at an advanced stage of the disease. Sterility is not an invariable accompaniment.

When nerve leprosy develops in children it has a stunting effect upon their growth. The aspect of precocious senility, the nervous troubles culminating in paralysis, ulcerations, and consecutive mutilations, with progressive emaciation, form an easily recognized clinical picture.

The patients die either of intercurrent diseases, or from exhaustion consequent upon long-continued digestive disorders or colliquative diarrhœa.

MIXED TYPE OF LEPROSY.

Under this designation are included those cases which combine the characteristic lesions of both the tubercular and anæsthetic forms. The disease may be, in the beginning, tubercular in character, but in the course of its evolution it becomes modified in severity and exhibits the milder features of the anæsthetic form; it is less progressively active, and the duration of life is considerably prolonged. On the other hand, the initial symptoms may be those of nerve leprosy, which later become complicated with the development of tubercles and correspondingly intensified in severity (Fig. 55). More rarely the symptoms peculiar to both forms may be present from the first, the course of the disease being influenced favorably or unfavorably according to the predominance of nerve or cutaneous lesions. The proportion of mixed cases varies in different countries. Taking my observations of one thousand and fifty lepers at Molokai (1889) as the basis of comparison, about one half were tubercular, one third anæsthetic, and the remaining one sixth of the mixed type. Since then the proportion of anæsthetic and mixed cases has largely increased.

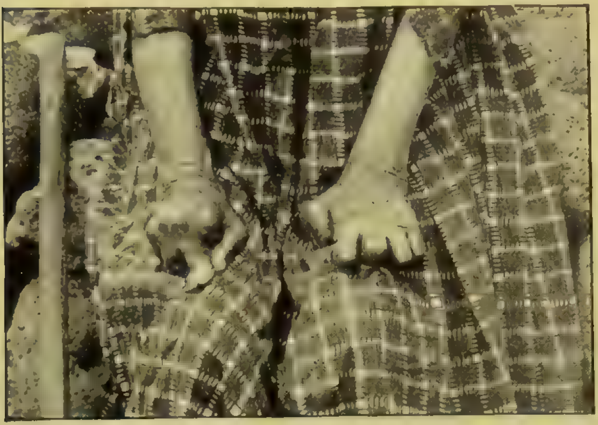


Fig. 53.—Anæsthetic leprosy, showing peculiar deformation of hands. (From author's Hawaiian collection.)

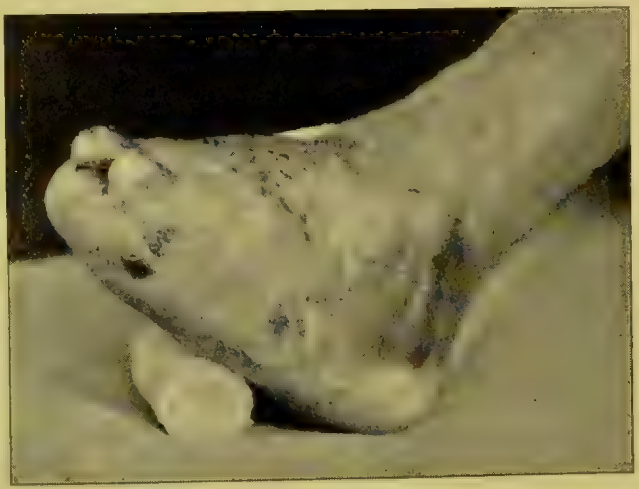


Fig. 54.—Anæsthetic leprosy, showing multilation of toes. (From author's Hawaiian collection.)

Kaposi and other writers describe a *macular form* of leprosy. There is no well-founded basis for this additional clinical division; macular lesions are met with in both tubercular and nerve leprosy—they simply represent a phase in the evolution of the disease, and are no more distinctive than other features which are common to both forms.

Pathological Anatomy. (*The Bacillus Lepræ.*)—The bacillus of leprosy is a slender, rodlike parasite, in length from one half to three quarters of the diameter of a human red blood-corpuscle ($\frac{1}{5000}$ inch), and in breadth about one fifth the length (Fig. 56). The morphological characters of the leprous bacilli are so similar to those of the bacilli of tuberculosis that it is difficult to differentiate them by their microscopical aspect. The former are distinguished by relatively greater abundance in the tissues, their occurrence in clumps, and their readier reaction to staining agents, "dependent upon the micro-chemical reaction of the investing membrane of the bacillus to acids, alkaline and aniline dyes."

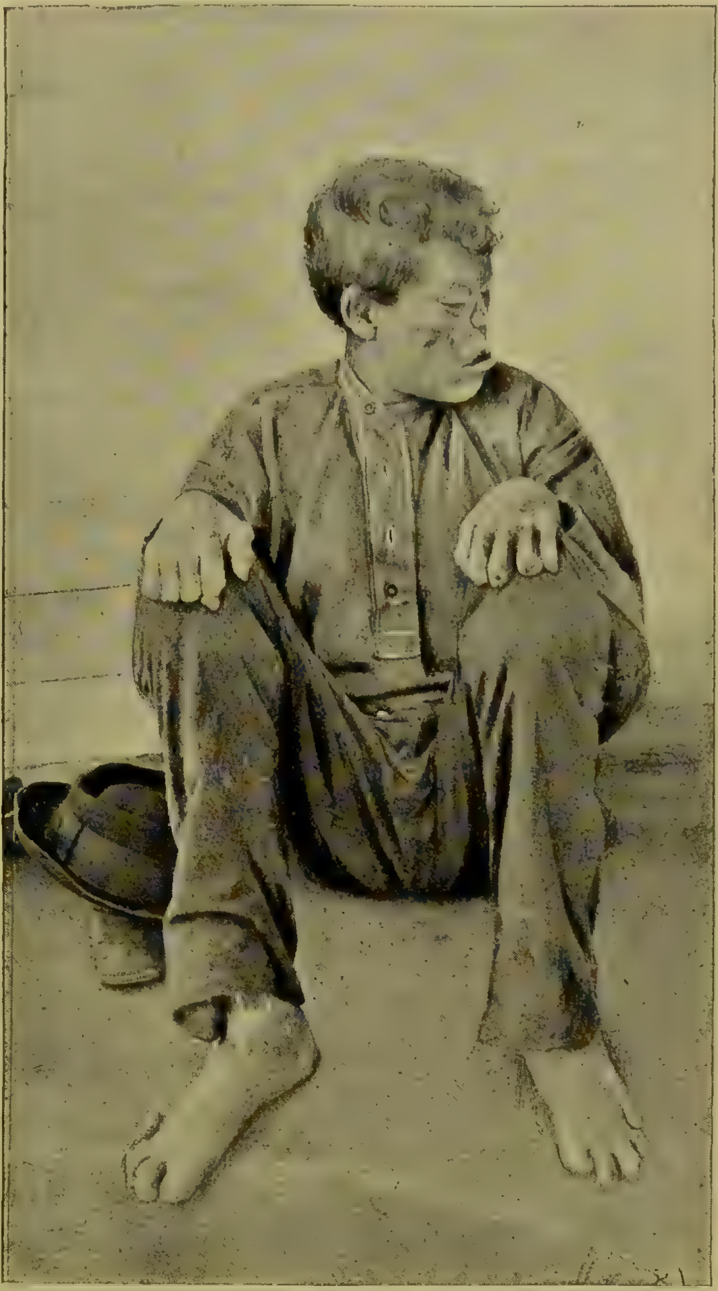


Fig. 55.—Mixed leprosy, anæsthetic type, with tubercular changes in face supervening. (From author's Hawaiian collection.)

Distribution of the Bacilli.—Like all specific microbes, the bacillus lepræ has an elective affinity or predilection for certain tissues and fluids of the organism. The bacilli occur in all forms and stages of tubercular leprosy; they are found in both the diffuse and nodular infiltrations of the skin and mucous membranes, in the connective tissue of the peripheral nerves, in the cornea, the cartilages, and in the liver, spleen, and kidneys, sparingly in the spermatic tubes and testicles; also in the ovary (Arning). They are found abundantly in the lymphatic glands and spaces and sebaceous glands (Babes and Unna), and in the hair-follicles. They are not found in the blood, except in the last stages of the disease, and they are absent from the physiological secretions, as the tears, saliva, milk, urine, semen, etc., exception being made possibly for the spermatic fluid. It is worthy of note, however, that when the nasal, pharyngeal, and intestinal mucous membranes become the seat of leprous deposits, the pathologically altered secretions from these membranes swarm with bacilli. They are also absent from the menstrual fluid and the secretions of the vaginal mucous membrane.

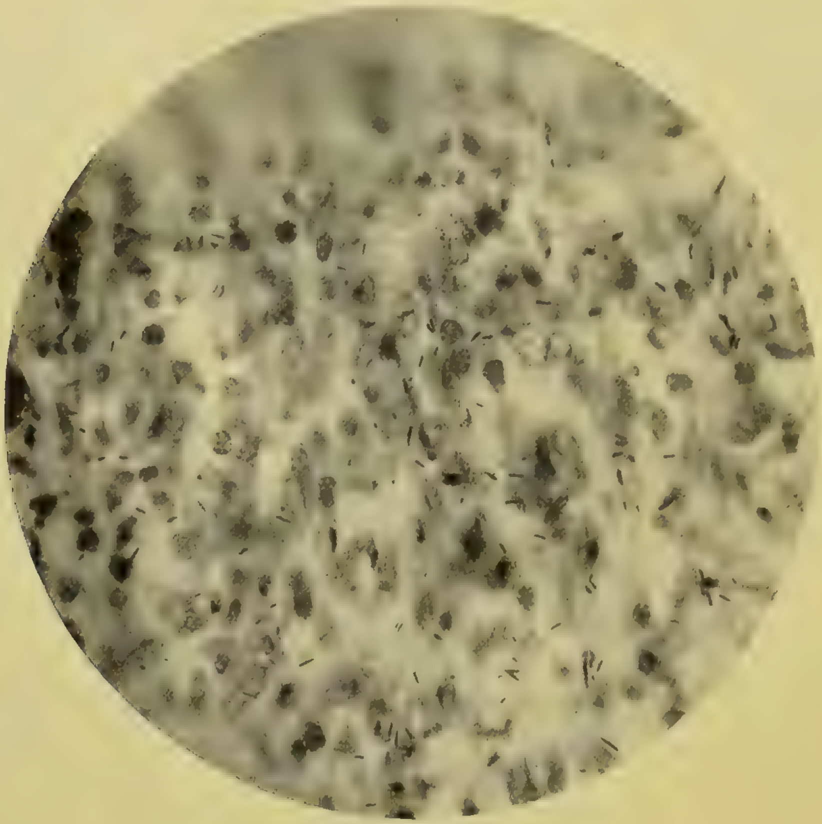


FIG. 56.—Bacilli lepræ (Fordyce).

Outside the Human Body.—Arning made careful and repeated examinations of the air, water, and food for leprous bacilli, but the results were invariably negative. The bacilli have been found sparingly in the dust and dirt of rooms where lepers have lived, in the soil habitually trodden by lepers' feet, and in the earth where lepers have been buried, although it could not be determined whether they were living or dead. Arning states that the bacilli seem to multiply in the bodies of dead lepers months after they have been buried. He admits, however, the impossibility of proving in any particular case whether they are living or dead bacilli, and asserts that we can never be able to decide the question of direct contagion or infection through the intervention of the ground, water, or food, until we are able to show a comprehensible difference between living and dead bacilli, either by culture or by invariably successful inoculations in the lower animals.

Culture Experiments.—Experiments in the artificial cultivation of the bacilli in various culture mediums have for the most part failed. Doubt has been cast on the authenticity of cultures claimed to be successful—those of Campana, Ducrey, and others—since in no instance has the pathogenetic nature of these cultivations been established by inoculative experiments.

Transmission to Animals.—So far as known, live leprous bacilli are exclusively human in their habitat. The numerous attempts thus far made to inoculate the lower animals have failed, although Melcher and Ortmann claim to have successfully inoculated rabbits with bits of leprous tissue. The failure to recultivate the bacilli found in the organs invalidates the scientific value of their experiments. Köbner's claim that he had succeeded in producing local leprosy in a dog, and that of Danische that he had successfully inoculated a cat, can not be accepted.

Inoculation Experiments.—All of the attempted experiments in inoculating leprosy upon previously healthy persons have failed, exception being possibly made for Arning's experiment on Keanu. Dr. X——, of Norway, according to Leloir, inoculated himself and twenty persons with blood and pus from ulcerating tubercles, with negative results, except the production of lymphangitis. Profeta inoculated two women and eight men, himself included, with the secretions of leprous ulcers, without result. The only experiment claimed to be successful was that of the convict Keanu, who was inoculated by Arning, in 1884, with pus-laden bacilli, and, in addition, a portion of a tuberculous nodule was inserted subcutaneously. This man developed leprosy, from which he has since died. In 1889 I excised a small subcutaneous nodule from the arm of Keanu and a portion of the overlying skin. Bacilli were found abundantly present in numerous sections of this specimen. The scientific value of this inoculation has been nullified by the fact that Keanu came of a leprous family—his son, brother-in-law, cousin, and nephew were all lepers—and it is not improbable that he may have had the seeds of the disease in his system previous to the inoculation.

Wesener's experiments would go to show that, unlike the bacilli of tuberculosis, lepra bacilli, if introduced in the living tissues, remain unabsorbed and susceptible of being impregnated by coloring matter for an indefinite length of time. He found the results to be identically the same, whether he introduced pieces containing bacilli which had sojourned in alcohol for two years or fresh pieces. On both cases the only manifest reaction was of a phlogistic nature, of a purely local character, and similar to that which would have followed the introduction of any inanimate matter, such as charcoal or cinnabar. The bacilli become incorporated with the cellular elements, and their form persists intact. When introduced together with their leprous material by Neisser in his inoculations of rabbits and dogs, inflammatory nodes resulted. He supposes that the spores penetrate the system and develop wherever they find a suitable nidus, especially in the lymphatic glands.

Besnier does not believe that the bacillus survives the leper. "The bacillus does not vegetate indefinitely in any one point of the leper, but decreases in number, and sometimes disappears entirely, or nearly so, from tissues which are degenerated or destroyed. If removed from its normal habitat, or if the leper dies, the bacillus seems immobile and cadaveric. If deposed in foreign but living tissues, or left to its own fate in a fragment of skin excised from either the living or dead leper, the bacillus remains unaltered and immobile for years (ten years, Köbner), surviving cadaveric decomposition and resisting the putrefactive bacteria (Arning). This cadaverization of the bacillus explains, according to Besnier, the negative result of cultures and inoculations, and allows us to understand how it is that leprosy is wiped out when the leper dies, offering a new and fundamental distinction from Koch's bacillus, which retains its vitality and virulence throughout an incredible length of time and of conditions (Besnier, Sur la Lepre, Paris, 1887).

The presence of the bacilli in the tissues set up, either directly or indirectly through their toxines, inflammatory changes, resulting in the production of the lesions peculiar to the disease. They also specially modify by their presence the exudation cells and the endothelium of the lymphatic and blood-vessels, forming the so-called "lepra cells" and giant cells which impart specific characters to the new growths, which differ from ordinary granulation tissue in being less vascular and therefore undergo retrogressive changes more slowly. All the products of tubercular leprosy contain myriads of bacilli, which, however, are much rarer in pure nerve cases. Microscopical examination of sections of skin covering recently formed lepromata demonstrate the epidermis to be intact and normal. I excised a portion of leprous skin about the size of a silver half dollar from the back of an anæsthetic leper in whom evidences of the disease had existed for more than ten years. The dissection extended down to the subcutaneous tissue. Careful examination of many sections showed the absence of bacilli. It was interesting to note that, although the line of incision extended beyond the reddened skin, within a few months the pigment changes appeared in the surrounding tissue.

In the developed stage of tubercular leprosy the bacilli are found in the skin. The papillæ are somewhat hypertrophied and filled with little round cells. In old tubercles the papillary outlines have disappeared and the entire stratum been replaced by a uniform layer of small cells. The entire dermal tissue is infiltrated by round or ovoid cells which are here and there grouped in illy defined masses and penetrate into the celluloadipose tissue. The adventitious tunics of the blood-vessels, as also their internal layer, are thickened, and their caliber narrowed. The sudoriparous and sebaceous glands and the follicles are implicated from the onset, and, choked by the multitudes of little cells formed at their periphery, end by totally disappearing. Nearly all these newly formed cells contain great numbers of bacilli. They are also found in the flattened cells of the adventitious coat of the blood-vessels, as well as in the cells of their inner tunic. It is probable, according to Cornil and Babes, that the bacilli are first deposited in these blood-vessel cells. The bacilli are found sometimes outside of cellular formations in the lymphatic spaces. The cells designated as "lepra" by Virchow are found in the dermal groups of the old tubercles. "It results, from the presence of the bacilli in the pilosebaceous apparatus and epidermis, that the lepra parasite can be eliminated by the dermal surface, and possibly be received by it" (Cornil and Babes, 1890). The fluid that issues from a pricked tubercle contains bacilli either free or inclosed by a lymphatic cell.

The various membranes of the eye are attacked usually by the bacillus subsequently to the appearance of the cutaneous lesions. In one instance, however, the leprosy commenced in the eye, which presented a lesion resembling sarcoma, and the diagnosis was only made by Meyer and Berger after the apparition of a similar tumor on the other eye, and of characteristic cutaneous tubercles. The microscopical examination of the first ablated tumor by Cornil revealed the presence of numerous characteristic bacilli. Leloir found few bacilli in the various sclerous glossites, but many in the superficial tubercles. The lymphatic ganglia of the neck, as well as of the other diseased parts of the body, are infiltrated and disorganized by bacilli. In some cases, early in the course of the disease, the function of the testicles may be compromised by a small cell infiltration in the connective tissue between the tubercles and the seminiferous canals filled by cells containing numbers of bacilli. Bacilli have been found in all the tissues of the body by Cornil and Babes, in one case examined in Virchow's laboratory, and in another at the Sanitary Bureau of Berlin. Even the apparently healthy organs were attacked. Rake, of Trinidad, has sometimes found bacilli in the kidneys.

The most essential changes in anæsthetic leprosy are leprous deposits containing bacilli within the sheaths of the nerves and between the individual nerve tubes, producing a neuritis, and leading ultimately to their degeneration and more or less complete abolition of their function. These changes are practically confined to the peripheral nerves.

Hansen, Hillis, and Neisser have repeatedly examined the spinal cords of lepers and have invariably found them healthy. The parenchymatous organs are disorganized when the disease has existed a long time, especially consecutively to the ulceration of the skin and the mucous membranes. They then present a fatty and amyloid degeneration. There is chronic pyæmia. Tschiriew found small, roundish bodies accumulated in the tissue of the ependyma in a leprous case, in which there was atrophy of the gray substance of the posterior cornua, with complete integrity of the white substance and of the roots of the nerves.

Etiology.—The discovery of the bacillus of leprosy by Hansen in 1874, and its subsequent confirmation by Neisser and others, has thrown a flood of light upon the etiology of the disease. The fact that this organism is invariably and exclusively found in the bodies of lepers, establishes its causal connection with the disease beyond question. It may be positively affirmed that leprosy never originates spontaneously, and that the specific products caused by the bacilli alone contain the infectious material by which it is propagated from one individual to another.

Contagiousness.—The contagiousness of leprosy would seem to be a necessary corollary of the demonstration of its parasitic nature. The existence of a specific bacillus is not, however, accepted by all as convincing proof that it is transferred directly by contact of a leper with a healthy person.

Without entering into a review of the changes which medical opinion has undergone in reference to this point, it may be said that a belief in the contagiousness of leprosy was almost universally held until within recent times. This conviction was disturbed by the promulgation of the dogma formulated by the Royal College of Physicians in 1867, that leprosy was not a contagious disease. For many years thereafter the doctrine of contagion was abandoned by a majority of the profession. Still more recently the pendulum of medical opinion has swung in the other direction.

Numerous examples might be cited to prove the contagiousness of leprosy. Dr. Thin (Leprosy, by George Thin, London, 1891) quotes no fewer than sixty well-authenticated observations showing the communication of the disease from lepers to previously healthy persons with whom they had been brought in contact. We are obliged to admit professional leprosy as well as professional syphilis. Numerous cases of physicians and Sisters of Charity are recorded, who have expatriated themselves for humanitarian reasons, and, without any personal antecedents of a pathological nature, have contracted leprosy in their arduous care for the sick in the *leproseries* (Besnier). The case of Father Damien is too well known to require more than mention. Father Boglioli, whose case was recorded by Prof. Joseph Jones in 1881, had attended a number of cases of leprosy in the Charity Hospital of New Orleans, and remembered giving extreme unction to two of them, rubbing their hands with oil during the administration of the rites. The first symptom was a swelling of the mucous membrane of the nostrils.

The outbreak of leprosy in a new center can always be traced to the immigration of lepers. The facts of the development and spread of leprosy in the Sandwich Islands furnish the most abundant and conclusive proofs of its contagiousness. Upon no other possible ground can be explained the remarkably rapid dissemination of the disease, which within the space of a single generation has decimated the native population of these islands. At the present day there are about twelve hundred lepers in the settlement of Molokai. It is estimated that from five to ten per cent of the entire native population are affected with the disease, while many foreigners coming from countries where leprosy is not endemic, and in whom no hereditary taint can possibly be alleged, have fallen victims.

The recent development of leprosy in Louisiana, its rapid spread in Key West, Florida, California, and other places, can not be explained on any other hypothesis than that of contagion. Hicks says there exists the strongest evidence in favor of the contagious nature of the disease in the United States of Colombia. In districts where leprosy was formerly unknown it could be distinctly traced to contact with the inhabitants of other provinces. Contagion only occurred when healthy and leprous persons lived in great intimacy with one another, eating from the same vessel, wearing the same clothes, and sleeping in the same bed. Personal cleanliness greatly diminished the contagion. The remarkable spread of leprosy in New Caledonia, and in other new centers, can be traced to the importation of and contaminating contact with lepers.

The opponents of contagion base their belief largely upon the observations of numerous persons who have lived in prolonged and intimate contact with lepers without having contracted the disease—wives with leper husbands, medical men, Sisters of Charity, and nurses in close contact with lepers in hospitals. I might instance the case of Mr. D——, who has lived nine years at the leper settlement of Molokai, his principal work being the dressing of leprous sores and ulcers, sometimes attending to as many as one hundred and fifty a day. Numerous instances are on record of wives living with several leper husbands in succession without showing any signs of the disease. The husband of the woman and father of the two daughters represented in Fig. 46 had lived for twenty-nine years with his leprous wife, and yet remained absolutely exempt from all manifestations. These negative proofs of contagion are, however, so overshadowed by the immense mass of positive clinical testimony, that they fall to the ground. They are examples of individual immunity which is manifest in relation to other diseases admittedly contagious. They simply prove that there is nothing constant in contagion, and in order that contagion may operate, a susceptibility or receptivity on the part of the individual is an essential condition. At what period in the evolution of leprosy it becomes endowed with contagious activity—whether during the prodromal stage or not until the eruptive stage, or whether it is delayed until the tubercles have softened and broken down—has not been determined.

Hereditary Transmission.—Formerly heredity was regarded as the principal factor in the propagation of leprosy. From a scientific standpoint the conception of leprosy as a parasitic disease is irreconcilable with the theory of its hereditary transmission. To speak of "inherited infection" is a contradiction in terms. As in the case of tuberculosis, with which leprosy presents so many analogies, the influence of heredity is probably limited to the creation of a predisposition to the disease. This may be expressed in an abnormal susceptibility to the admission and pathogenetic action of the bacilli, due to a weak constitution and diminished capacity of resistance of the organism inherited from the leprous progenitors.

But independent of theoretical considerations, the facts of observation show that heredity can not be regarded as a prominent factor in the propagation of leprosy. As I previously pointed out (Personal Observations of Leprosy in Mexico and the Sandwich Islands, New York Medical Journal, 1889), the history of leprosy in the Sandwich Islands shows conclusively that the rapid increase in the number of lepers is vastly disproportionate to the number of births among the lepers. Sterility is the common and almost invariable result of marriage between lepers. In the rare cases where conception takes place it most often results in abortion, stillbirth, or in delicate children who soon succumb. This is most pronounced when both parents are lepers, less marked but still notable when only one partner is a leper. Only five children were born in the leper settlement of Molokai within ten years after its establishment, although no restrictions were placed upon the intermarriage of the lepers. In 1886 Dr. Moritz collected statistics of twenty-six children born in the leper settlement, whose ages ranged from three to fourteen years; of these, nine became lepers, while seventeen showed no signs of the disease. Considering the multitudinous opportunities for post-natal contagion from contact with leprous kindred in the intimacy of family life, it seems probable that if these children had been promptly removed from their leprous *entourage* they would have escaped the infection. It was largely because of the commonly observed exemption of the offspring of lepers from the parental disease that the Kapiolani Home was established at Honolulu. The practical working of this scheme of separation shows that if children are removed from contaminating contact at an early age, before post-natal infection takes place, they remain free.

My examination of numerous lepers in Mexico failed to reveal the history of family taint in a single individual. Dr. Hansen, who in 1891 made a tour of investigation through the Scandinavian colonies of North America, found that among all the descendants of one hundred and sixty lepers who had emigrated from Norway to this country, not one had become a leper. Dr. Brockmann (quoted by Thin) estimates that there must be in Minnesota alone one hundred thousand persons of Norwegian descent of leprous ancestors (direct and collateral), yet leprosy has never appeared among them. Numerous other observations equally convincing might be quoted. The Leprosy Commission report (1892), as the result of its investigation of the facts of Hereditary Transmission of Leprosy in India, that "the percentage of children, the result of leper marriages, is too small to warrant the belief in the hereditary transmission of the disease," and further, that "a specific hereditary predisposition to leprosy is but slight, and practically does not exist."

Further, there is no well-authenticated case of congenital leprosy on record. Navorro has reported a case as one of congenital leprosy which apparently is one of inherited syphilis. "Two months subsequently to the child's birth the mother showed decisive signs of leprosy, as did also her eight-year-old daughter." All three died within two years; but as syphilis is by no means excluded, we would wish for a more detailed account before accepting this as a decisive case in favor of the hereditary transmission of leprosy.

The clinical history of leprosy in children is more in accordance with the doctrine of contagion than that of inherited transmission. The liability of the children of leprous parents to contract the disease is in direct ratio to their exposure to the ordinary sources of contagion. Leprosy never shows itself until months or years after birth,* rarely before the third or the fifth year, which would correspond to the classic period of incubation of the acquired disease. Quite frequently the first manifestations are seen about the age of puberty. In the immense majority of cases it does not develop until the thirtieth or fortieth year.

Modes of Infection.—Although the efficient cause of leprosy has been identified and demonstrated beyond all possibility of doubt, there are many points connected with the modes of entrance of the bacillus into the system and the conditions which favor its growth and propagation, concerning which our knowledge is by no means definite.

Whether leprosy may be propagated by inoculative contact through sexual intercourse, through the skin by accidental wounds or lesions of continuity; whether it may be conveyed by the process of vaccination, or by the bites or stings of flies, mosquitoes, or other insects; whether its virulent principle may attach to the soil, water, and food, and be introduced, as are the germs of cholera, by imbibition, or by inhalation of the virus contained in the sputum, disseminated in the form of dust through the air, as is tuberculosis—are points concerning which there is great diversity of opinion. The absence of any definite primary lesion which marks the entrance of the virus into the system tends to still further complicate the pathogenetic problem.

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*While on a visit to the leper settlement of Molokai, I secured the placenta, cord, and portions of the body of a child stillborn, at full term, of leprous parents. Repeated examinations of these specimens by Dr. Fordyce showed an entire absence of bacilli.

Sexual Intercourse.—In many leprous countries this mode of contagion is generally accepted by the laity, and also by the profession. as the almost exclusive mode of propagating the disease, based upon the observation that if the husband or wife were leprous the healthy partner often became contaminated, and that a healthy person having illicit relations with lepers frequently contracted the disease. This opinion is so universal and deeply rooted in the Sandwich Islands, that accusations of immorality were brought against Father Damien, based solely on the ground that his disease could only have been contracted through illicit intercourse. At least two of my patients from Honolulu have assured me that their principal dread of having the real nature of their disease known was that it would carry to the minds of their friends a conviction of their immorality.

Although I formerly attached considerable significance to this possible mode of contagion, I now believe that it plays a very inappreciable *rôle* in conveying the germs of leprosy. The thousand-and-one intimacies which attach to the married relation afford abundant facilities for infection quite independent of sexual contact. Moreover, the fact that the presence of the bacilli in the spermatic fluid is doubtful, and that the female organs of generation are notably exempt from leprous manifestations, would render improbable this mode of infection.

Wounds and Abrasions of the Integument.—It is a question whether the virulent principle of leprosy may find entrance to the organism through cracks, fissures, or abrasions of the integument. The fact that the first appearance of leprous manifestations is commonly on the exposed parts—the face and extremities—and that in countries where the natives go barefoot the plantar ulcer is often the earliest lesion, lends support to this view. The popular superstition of the danger of handling tools or other articles which have been used by lepers doubtless has some basis of fact. The case reported by Hawley Benson, of an Irishman who had never been out of his native country, and who contracted the disease from wearing the clothes of his deceased leper brother; that of a patient who came into a leper hospital in Norway with the history of "no leprosy in his family; has twelve healthy brothers and sisters; has not associated with lepers; seven years ago he bought a coat that had belonged to a deceased leper, which he wore daily"—and numerous others of like tenor scattered through literature, would indicate that the disease may be conveyed in this manner.

Leprosy communicated by a Bite of a Leper.—I find among my numerous notes taken in Molokai the following:

Tubercular Leprosy.—John G——, native of Germany, on July 4, 1877, was bitten by a native leper, an advanced case, who died of the disease in 1883. The bite was on the middle finger of the right hand, quite severe, nearly to the bone. Hand and forearm at once swelled badly; was lame and painful, with shooting pains for about a week. Wound gradually healed, his hand and arm becoming as usual; so remaining until 1884; then noticed that the right hand assumed a bluish appearance occasionally; later on the other hand became similarly affected. Soon afterward a bluish spot appeared on the right side, which spot still persists, though now has become yellow. Early in 1885 began to have what he termed "blood boils" on various parts of the body, mostly on neck and cheek; was declared to be a leper, and sent to the leper settlement. Firmly believes from all the circumstances that the disease had its origin with him from the bite of the native leper.

Vaccination.—In the Sandwich Islands the opinion generally prevails that leprosy may be inoculated in the process of vaccination. This opinion was based upon the observed fact that there was a notable increase in the number of cases of leprosy after the general vaccination of the natives immediately succeeding the smallpox epidemics (in 1852, 1868, and 1872), and that numerous leprous centers developed in various parts of the islands where the disease had previously been unknown. Dr. Arning states that a very remarkable local accumulation of fresh leprosy cases, fifty or sixty in number, took place in 1871–'72, at a place called Lahina, about a year after a universal arm-to-arm vaccination which had been most carelessly performed.

Mr. B——, an intelligent resident of Maui, gave me the following case coming under his personal observation: "The family of a missionary on the island of Maui consisted of father, mother, and five children. The older members of the family having been vaccinated previous to their coming there, only the youngest child was vaccinated with humanized lymph. This child alone of the entire family became a leper." In many places vaccination was performed by careless and unskillful persons; humanized virus was used, and it is presumable that careful discrimination was not always made between a leprous and a healthy person as vaccinifers. The classic case of Dr. Gairdner, and those of Dr. Daubler, of Robben Island, and others well known in medical literature, would seem to afford conclusive evidence as to the possibility of this mode of conveying the disease. Arning and others have demonstrated the plentiful presence of bacilli in the crusts of vaccine pustules in tubercular lepers, and it must be admitted that if the disease be inoculable, vaccination constitutes a direct and most effective mode of conveying the germs.

Tebbs, in a recent work, endeavors to demonstrate that the remarkable recrudescence of leprosy in various countries, at the present day, is due principally to inoculation through the process of vaccination. While such a sweeping statement can not be accepted, it must be admitted that the author has collected a vast number of weighty observations which give plausibility to his views. It is, of course, only in countries where humanized virus is employed that this possible danger exists, and it must be remembered that in leprous countries there are so many opportunities for infection in other ways that escape recognition, that the proof is rather presumptive than positive.

Inoculation by Insects.—In leprous countries there is a more or less general impression that the germs of the disease may be transported from a leper by flies and mosquitoes, and inoculated into a healthy person; and also that the lesions of the *acarus scabiei*, or other animal parasites, may serve as openings for the entrance of the virus. Arning frequently examined, bacterioscopically, mosquitoes gorged with blood, which were found inside the mosquito nets of beds containing cases of severe cutaneous leprosy, without discovering traces of bacilli either in or upon them. Others have examined flies and mosquitoes which came in contact with leprous patients, and itch pustules on the bodies of lepers, but always with negative results. That mosquitoes and flies are carriers of contagion appears very improbable, since, if this were the case, the transference of the disease from the leprous to the healthy, in countries where these pests abound, would be much more common.

Inhalation.—This mode of infection rests upon presumptive rather than positive proof. It is not probable that the germs of the disease are contained in the expired air; but the sputum of leprous patients, which has been shown to be loaded with bacilli, disseminated through the air through particles of dust, may, I believe, serve as a means of transport of the contagion.

The Fish Theory.—The fact that leprosy occurs much more frequently along maritime coasts, where the inhabitants employ fish as the main article of diet, led, doubtless, to the popular tradition that leprosy was caused by salted or rotten fish. The strongest supporter of the fish hypothesis at the present day is Mr. Jonathan Hutchinson, of London. The advocacy of the fish origin of leprosy, notwithstanding the demonstration of its parasitic origin, only shows how facts may be strained to meet the exigencies of some particular theory or personal point of view. Mr. Hutchinson thinks that fish may cause leprosy in one of two ways—by the direct introduction of the bacilli into the stomach, or some element of fish food rouses into activity a bacillus already existing in the tissues. The hypothesis that fish serves an intermediary host function for the bacilli is improbable, from the fact that these organisms have never been found in fish caught in epidemic areas, although frequent examinations have been made. A view of the fish hypothesis differing radically from that of Hutchinson is taken by Neve, who believes that the leprous bacillus may find conditions favorable to its germination among the considerable number of organisms generated by putrefying fish, hence the latter serve as a culture medium as well as a means of transport. Almost every article of food has been in turn incriminated as an etiological factor, as salted meat, especially pork, an exclusive vegetable diet, milk, etc. Hicks and Blanc believe that the influence of diet is limited to "preparing a defective and inflammatory gastro-intestinal condition for the reception of the bacillus." The fallacy of the fish theory is proved by the fact that leprosy occurs among people who have never tasted fish, either because it was not obtainable, or because its use was forbidden by their religion.

In the study of the transmission of leprosy, it can not be a question of a particular kind of food, but only if the characteristic bacillus is present. If the food contains bacilli, they must have been derived from the diseased tissues of a leper. The nodules and diffused infiltrations of the mucous membranes of the mouth, of the throat, of the nose, of the large intestine, and of the rectum, contain immense numbers of bacilli, which are set free on the breaking down of these tissues, so that the saliva, the mucous discharge from the nose, and the dysenteroid excrement contain vast numbers of them (Arning). Once freed from their *nidus* their dissemination is a matter of chance, to be only prevented by extreme cleanliness and proper hygienic precautions. I believe that the bacilli may be deposited on articles of food with which lepers come in contact, and in this way carry the contagion. We can also understand that certain foods may so modify the constitution of the tissues that they offer a more suitable soil for the growth of the bacillus which has been introduced into them.

In the writer's opinion, most observers err in assuming that there is *one exclusive mode of infection* in leprosy. It is probable that, like the bacilli of anthrax, glanders, and tuberculosis, the mode of entrance of the parasite into the system is not unique, but multiple. We know that the bacillus of tuberculosis, which presents so many analogies with leprosy, may enter through the respiratory tract, the intestinal mucous membrane, or be inoculated through the skin. I believe that, similarly, the bacillus lepræ may be introduced through more than one channel of entrance. Direct inoculation through the skin, in any of the manifold ways which have been considered, plays, in my opinion, a very unimportant *rôle* in the propagation of leprosy. In the vast majority of cases, I believe that the vehicles of the virus through which contagion is effected are the secretions of the mouth and nose, and that the port of entrance is the mucous membrane of the respiratory and intestinal tract, with secondary infection through the blood or lymphatic system. The contagium may be conveyed directly from a leper to a healthy person through the intermediary of food, drink, a pipe, cup, or other object upon which it may be deposited. This view is supported by the observation that in all countries where leprosy has rapidly spread, *promiscuity*, or communism in the matters of eating, drinking, and sleeping prevails. The habits of the natives of the Sandwich Islands are thus described to me by Mr. Meyer, the superintendent of the leper settlement of Molokai: "Their modes of eating are so extremely careless that inoculation can readily take place through the mouth, by means of the saliva or otherwise. They pass their pipes from mouth to mouth, whether any of their number is a leper or not; they kiss, and rub their noses together; they eat out of the same calabash with their fingers, and drink out of the same cup; in eating fish or meat it is not cut up, but one takes the meat in his hand, and, after taking a bite, passes it on. They drink *ava*, which is prepared by others chewing the root, and whether the chewer is a leper or not is not considered. Foreigners also become addicted to this habit of *ava* drinking, and it is remarkable that most of the foreigners who have become lepers were *ava* drinkers. Most of them have been mechanics, and the only cause to which they ascribe their disease is having worked with lepers and handled the same tools. The disease may have been communicated in some instances from food handled by lepers in an advanced stage."

Turning now to another important center of leprosy, we find that the Norwegian peasants, according to Leloir, are very dirty; they never wash their bodies; their clothing is never taken off, even for the purpose of sleeping; they live, promiscuously gathered together, in a small cabin; almost always several persons sleep in the same bed; everybody eats at the same table, from the same dish—often with a common spoon—and drinks from the same vessel. It is not surprising that leprosy is communicated under these conditions of intimate contact; yet these same lepers, transported to the United States and adopting the more civilized customs of living—with greater cleanliness, in separate, newly built houses, which are not filthy nests of contagion—do not spread the disease. Hansen attributes much importance to sleeping in the same bed with lepers in connection with the communication of leprosy.

Age seems in no way to predispose to the contagion of leprosy.

Sex undoubtedly modifies predisposition. In Norway there is a large preponderance of cases of the male sex, while in Molokai the number of male lepers is almost twice as large as that of the other sex.

Race.—No race is immune to leprosy. We must recognize, however, that racial peculiarities may influence susceptibility to the disease and modify its mode of evolution. The extraordinarily rapid increase and terrible fatality of leprosy in the Sandwich Islands must be ascribed largely to the habits and physical qualities of the people. They have a feeble vital tenacity, their capacity of resistance is small, and they succumb readily to diseases from which the average American easily recovers.

Climate.—Climate would also seem to exert a marked effect in modifying the virulence of the disease, so far as its contagious activity is concerned. Leprosy transplanted to this climate or that of central Europe does not take root and flourish, and each center of infection, instead of spreading, dies out from the lack of conditions favorable to its development. Of the one hundred and sixty leper immigrants from Norway scattered over the Northwestern States, none, so far as I am aware, have communicated the disease. On the other hand, in the warmer climate of Louisiana there has been a rapid spread of the disease. In 1888 Dr. Blanc reported forty-two cases that had come under his personal observation. In 1891, three years later, he reported forty-one additional cases, making a total of eighty-three. Of these, eighty, or all with the exception of three, were residents of New Orleans, sixty-three were born in the United States, and twenty were born in foreign countries. It is evident that climate must have played an important *rôle* in the rapid spread of the disease in Louisiana and its extinction in the Northwestern States. As a rule, a hot, moist climate favors the development of leprosy, just as a damp, cold region does. Subjects of this disease do better in equable, temperate climates.

Individual predisposition, whether inherited or acquired, must be recognized as a powerful factor in the contagion of leprosy. Observation shows conclusively that certain individuals are absolutely immune. They escape the disease despite the most prolonged and intimate contact with lepers and constant exposure to every condition favorable to its communication. Their immunity evidently depends upon a lack of receptivity or a greater capacity of resistance to the action of the pathogenetic organism. This capacity of resistance may be lowered by various causes, and the individual finally become a victim. Thus, a washerwoman who had two leper husbands in succession, and had for twenty years washed the soiled clothes of the lepers in the hospital at Molokai, and whose continued exemption had been frequently instanced as a proof of the noncontagiousness of the disease, I found in 1889 to be suffering from undoubted manifestations. Just as in tuberculosis, an exemption prolonged for years does not guarantee an absolute, permanent immunity.

This resistance of the tissues to the inroads of the bacilli is not only manifest in relation to the primary affection, but also in the further evolution of the malady, which in some cases is extraordinarily rapid, and in others exceedingly slow and protracted. In certain cases the capacity of resistance is sufficient to dominate and destroy the pathogenetic microbes. Abortive cases are occasionally seen which show indubitable signs of leprosy, which after a time disappear definitively, and they remain ever afterward free from any signs of the disease. All causes or conditions which impair the health or lower the vitality of the individual predispose to contagion; excessive work, poor food, bad hygiene, nervous exhaustion, etc., must be placed in the category of contributory causes.

Diagnosis.—The clinical features of a case of leprosy, typical in its development and advanced in its evolution, are so striking and characteristic as to be absolutely pathognomonic. It is impossible to confound it with any other disease. But in the early stages, and even in fully developed cases with atypical manifestations, there is no disease in the domain of dermatology more difficult of recognition.

Thin (*loc. cit.*) cites examples of numerous cases "erroneously diagnosed by observers experienced in dermatology"—for example, that of a patient with well-developed nerve leprosy, who was sent home from India as a case of lupus erythematosus; two other cases in which typical anæsthetic patches with pigmentary changes were wrongly diagnosticated; that of a medical man in the Indian army, himself a leper, who with other medical men in India regarded it as syphilis; a case of Hutchinson, which was treated for several years for rheumatic gout; a case of Abraham, confounded with carcinoma, etc. Instances might be multiplied of cases of leprosy with advanced trophic changes the nature of which was unrecognized. A patient of mine was for several months under the care of one of the most distinguished leprologists of Europe without his suspecting the nature of the disease, until his perceptions were quickened by accidentally learning of the patient's former residence in a leprous country.

In attending numerous examinations, by the Government Board of Physicians at Honolulu, of persons arrested as lepers, I was impressed by the large proportion of cases placed in the category of "suspects," embracing those presenting suspicious symptoms, but in whom evidences of the disease were not sufficiently clear and unequivocal to warrant their consignment to the leper settlement of Molokai.

The diseases with which leprosy is most liable to be confounded are certain eruptions of the erythematous type, various pigmentary affections of the skin, more especially of parasitic origin, as chromophytosis, tropical ringworm, etc., vitiligo morphœa, syphilis, sarcoma, cutaneous tuberculosis, arthritis deformans, and certain diseases of the nervous system.

The prodromal symptoms which precede the eruptive stage of the *tubercular form* possess but little diagnostic value. The same symptoms may be present in the secondary incubation of syphilis, or in other infectious diseases; the attacks of fever succeeded by profuse perspiration are frequently mistaken for ague. Their significance is seldom recognized until objective signs of the disease are manifest, and then they are of course valuable as a retrospective aid in diagnosis. The sensory disorders which form so valuable an element in the diagnosis of anæsthetic leprosy frequently fail in the tubercular form, and their presence or absence may be disregarded.

The macular lesions, which ordinarily constitute the first cutaneous manifestations of leprosy, present nothing absolutely distinctive, either in their objective characters or course. The earlier spots often simulate closely ordinary *erythema*. They are distinguished by their localization, their larger size, the absence of desquamation, their tendency to become nodular, and their slower involutive changes.

Syphilis presents many clinical analogies with leprosy, both in the polymorphous character of its manifestations and their mode of evolution. In both, the general accidents develop after a prolonged period of incubation. Syphilitic roseola has its analogue in leprous erythema; syphilitic pigmentation in the pigment spots of leprosy; syphilitic alopecia in the alopecia of leprosy. The papules and tubercles of syphilis have their counterpart in the dermic and hypodermic nodules of leprosy. In both, the neoplasms follow a similar course of involution; they may undergo resorption, or they may soften and suppurate and disappear by a process of ulceration, sometimes involving extensive surfaces and leaving characteristic cicatrices. Their points of dissimilarity are, however, too numerous and obvious to merit mention.

The erythematous syphilide may be distinguished from leprous erythema by the smaller size and fainter coloration of the lesions, their absence from the face and limitation to parts habitually covered by the clothing, and their more rapid disappearance. The erythematous patches of leprosy are larger, more diffuse, and more permanent. The pigmentations of leprosy are readily distinguished from the posthumous pigmentations of syphilitic infiltrations. The lenticular tubercles of leprosy, when they are disseminate, small, slightly elevated, with moderate desquamation, may resemble absolutely a papular syphiloderm. It is, however, the tubercular form of syphilis which bears the most deceptive resemblance to leprosy. The clinical features of the case of tubercular leprosy represented in Fig. 1, Plate XVII, are seen to simulate most accurately a tubercular syphilide. The syphilitic nodules are more circular in outline, more reddish-brown or coppery in color, more apt to be grouped in circular and crescentic forms, and more rapid in involution. The ulcerations of syphilis are more rounded, less circumscribed in extent, the crusts are thicker, harder, and of a brownish, blackish, or greenish tint. Leprous ulcerations progress more slowly than those of syphilis, and they do not present a serpiginous mode of extension. The large superficial infiltrations of leprosy are not seen in syphilis. Leprous neoplasms are larger in volume, more protuberant, and crowded upon an infiltrated base, with œdema of the skin and ganglionic enlargements. Their seats of predilection are the facial mask, the lobes of the ears, backs of the hands, and forearms, more rarely disseminated, while the nodules of syphilis are indiscriminate in their location and may come where leprous tubercles rarely or never appear. The leontiasis of leprosy is much more pronounced than that of syphilis. The enormous nodular masses, the deep orbital and supraorbital furrows, the pillowy-like protuberances of the cheeks, with loss of the eyebrows, are never observed in syphilis. Still, in many cases of less exaggerated development the facies of leprosy may simulate most closely that of syphilis.

Syphilitic infiltrations of the mucous membranes also bear a deceptive resemblance to those of leprosy; they affect the same structures and are followed by similar extensive destruction of tissues. The breaking down of the osseous framework of the nose, resulting in the broadening, flattening, and sinking in of this organ, is more common in leprosy. The harsh, raucous, or croaking voice of leprosy, the difficulties of deglutition and respiration, and the peculiar foul, leprous odor exhaled by the breath, serve to distinguish it from syphilis. The alopecia of leprosy differs from that of syphilis in that the scalp is not affected, while the hairs of the eyebrows and eyelashes disappear.

Lupus likewise shares with leprosy the pathological peculiarities of cell infiltration of the connective tissues of the skin, followed by disintegration of the morbid products and ulceration. Lupus vulgaris may be mistaken for leprosy, especially when the leprous lesions consist of small, brownish-red tubercles, grouped upon an infiltrated base and localized upon the cheeks or face; the frequent involvement of the lobe of the ear in lupus heightens the similitude. The infiltrations of lupus are more circumscribed in extent, limited in their localization, and not accompanied by anæsthesia. Lupus erythematosus may also be mistaken for leprosy. In the latter disease the patches are more apt to be multiple, the seat of perverted sensation, and associated with other signs of neuritis.

Mycosis fungoides is another disease which has been confounded with leprosy. The analogies between the earlier eruptions of these diseases are so many and marked that mycosis fungoides has been not inaptly designated by Bazin as *indigenous leprosy.* Both diseases are characterized by an eruption of congestive spots or patches, which may appear and recede a number of times before becoming permanent. These patches are the seat of the tumor formations characteristic of each disease. The tubercles may disappear by a process of resorption, or they may break down and ulcerate. Both diseases almost invariably progress to a fatal termination.

The erythematous patches of mycosis fungoides present a brighter or deeper red coloration; they are quite perceptibly elevated, with a more regular and distinctly circular contour, often surrounding islets of perfectly healthy skin. The macules of leprosy do not present the desquamating surface of the "eczematous patches," nor the pointed, somewhat mammillated elevations of the "lichenoid plaques" of mycosis fungoides. When the fungating stage of mycosis is reached and the tumors soften and suppurate, the two diseases may be readily differentiated.

Tubercular leprosy in its atypical forms has been mistaken for *lichen planus*, when the neoplasms are small, flattened, and closely aggregated; for *acne indurata* and *rosacea*, as instanced by Hebra; for *sycosis*, when the tubercles are limited to the hairy parts of the face. Leloir mentions a case in which the size, shape, and disposition of the lepromata were strikingly suggestive of *erythema nodosum*. I have seen a case in which leprous nodules had been mistaken for the tumors of *molluscum fibrosum*. Fortunately, in cases of tubercular leprosy a positive element of diagnosis is furnished by the microscopic examination of the leprous neoplasms. The *bacillus lepræ* is invariably present in leprous tissue, and in no other.

The Anæsthetic Form.—While the identification of the lepra bacillus in the tissues is rarely practicable in nerve leprosy, yet the invariable presence of anæsthesia in established cases constitutes a diagnostic element of almost pathognomonic value.

The pigmented spots may be yellowish or fawn-colored, giving quite a deceptive resemblance to *chromophytosis;* they are distinguished from chromophytosis by the absence of scaliness and the parasite peculiar to this disease. The affections with which the *achromic* spots may be confounded are vitiligo and morphœa. The patches of *vitiligo* are irregular in shape, of a dead white, their margin convex and clearly defined against the surrounding pigmented border; the hairs of the leucodermic surface are often white, the skin normal, unaltered in structure or sensibility. In leprous leucoderma the spots are grayish-white, not so sharply defined. The skin is altered in structure, atrophic, depressed, sometimes corrugated, often completely anæsthetic. The hairs of the affected surface often fall out, and are not invariably white. *Morphœa* is distinguished by its location, its waxy-white, lardaceous appearance, its hard, unyielding consistence, and its lilac border. As is well known, the terms *morphœa alba*, *atrophica*, *rubra*, *nigra*, etc., were formerly applied to the lesions of leprosy.

The pemphigoid blebs which characterize this form of leprosy may be mistaken for the lesions of *pemphigus vulgaris;* they are distinguished by their sparser and more superficial character, and by the dysæsthesia which ordinarily accompanies or succeeds them. The plantar ulcer bears a most deceptive resemblance, both in objective characters and evolution, to *mal perforant.* The lesions of the bones and joints, with mutilation and deformities, which commonly occur in the advanced stage, can scarcely be confounded with the clinical picture of any other disease.

In many cases leprosy pursues an anomalous course. The macular, pemphigoid, and other trophic changes may be absent, and motor and sensory disturbances constitute the only manifestations. There are many diseases depending upon lesions of the peripheral nerves and cord the symptoms of which may be accurately simulated by leprosy. When these neuritic changes are accompanied by the presence or history of leprous exanthems, or phenomena of hyperæsthesia and anæsthesia, swelling of the nerves, disturbances of the sweat function, leprous coryza, etc., there is no difficulty in diagnosis; but when such concomitant evidences fail, and the paralytic and atrophic changes constitute the sole objective signs, remaining stationary and persisting for months or years, the diagnosis may become exceedingly difficult.

Leprous neuritis may be limited to one or more nerves—the ulnar, for example—and the sole symptoms may consist in trophic changes of the hand. The paralysis may be limited to muscles supplied by certain branches of the cranial nerves, rendering it impossible to close the eyes, or the face may be drawn to one side. The atrophic and degenerative changes are often confined to the muscles of the hand and forearm, producing an accurate clinical picture of *progressive muscular atrophy.* There is the same wasting of the interossei, of the thenar and hypothenar muscles, paralysis of the extensors, with the resulting *main en griffe* characteristic of muscular atrophy, from which, however, it is readily differentiated by the sensory disorders present in the one and absent in the other.

Leprous neuritis presents many analogies with *multiple neuritis* of toxic or malarial origin, distinguished, however, by its more chronic course and the attendant dysæsthesia. The characteristic deformity of chronic rheumatism or *arthritis deformans* may be seen in leprosy. Leprosy has been mistaken for *hysterical paralysis*, *mutilating scleroderma*, and many other diseases characterized by trophic changes.

Syringomyelia is a disease with which anæsthetic leprosy sometimes presents the closest clinical analogies, and from which it may be most difficult to differentiate. Dejérine, who has studied the relations of syringomyelia to leprosy, regards the error of confounding the two diseases as almost inevitable in the absence of the prior manifestations and etiological history of leprosy. According to Marenstang (Revue de Médecine, 1891), the chief points of distinction are as follows: In syringomyelia there is a loss of thermo-anæsthesia, and analgesia, with integrity of the tactile sensibility, with absence of surface discolorations, and no affection of the muscles of the face. In leprosy, tactile sensibility is abolished; there are atrophy and paralysis of the face muscles, thickening of the nerve trunks, pigmented patches, dystrophia of the extremities, alopecia, and the presence of the bacillus of Hansen in the discharges from the ulcerative lesions. According to my observation, disassociation of sensory conditions can not be considered a constant differential feature, as it may exist in leprosy. I have a patient in whom the pain and temperature sense are entirely lost, while tactile sensibility is scarcely impaired.

Finally, in countries where leprosy is not endemic, but is only occasionally met with, an inquiry into the history and antecedents of the patient may give a clew to the nature of the suspicious symptoms. Possible exposure, either by known contact with a leper or residence in a country where leprosy prevails, is, of course, a *sine qua non* of contagion. The modes of infection are so many and mysterious that the mere fact of residence in a leprous country is sufficient presumptive proof of contagious exposure.

Prognosis.—The prognosis of leprosy is always unfavorable; with rare exceptions, it progresses to a fatal termination.

As regards the more or less rapid evolution of the disease, the prognosis is influenced by the constitutional vigor of the patient, expressed in the power of resistance of his tissues to the inroads of the bacilli, by climatic conditions and hygienic surroundings. It is a matter of common observation that in countries where leprosy is endemic, the course of the disease is much more rapid than when a patient with the disease in active evolution is removed to a temperate climate where it does not prevail. Whether the abatement is due to the climate, the food, or the changed habits of living, there is commonly observed, for a time at least, an arrest or retrogression of the symptoms. Unfortunately, this lull in the manifestations is, as a rule, deceptive in its duration; after a temporary truce the force of the disease reasserts itself, and the patient finally succumbs.

As regards the duration of life, the prognosis is much more unfavorable in the tuberculated than in the anæsthetic form. Where there is a transition of one form into another the prognosis varies accordingly as the prominent symptoms of one or the other type gain the ascendency. As Leloir somewhat paradoxically phrases it, "The worst that can happen to a trophoneurotic leper is to become a tubercular leper; the best that can happen to a tubercular leper is to become a trophoneurotic leper."

Abortive Cases.—The occasional occurrence of a spontaneous cure of leprosy must be considered in connection with prognosis. As compared with the vast number of cases which end fatally, the abortive cases are few in number but are nevertheless well authenticated. In every country where leprosy prevails we have records of patients who, after showing characteristic and unmistakable signs of the disease, experience a complete and permanent cessation of all manifestations. This exemption has been observed to continue for ten, twenty, thirty years, and longer, the patients finally dying of some other disease. This spontaneous cure may take place at any period of the disease. Most of the cases reported as cures are advanced in their evolution, and the reparative process takes place after more or less damage to the tissues. In the early stages, I believe, abortion occurs very much oftener than is generally supposed, leprosy presenting in this respect a striking analogy with tuberculosis. In all leprous countries the number of "suspects"—that is, persons who present suspicious but not positive, unequivocal signs of the disease—is very large; many such cases are classed as examples of *leprophobia.*

The natural process of cure is influenced by various conditions. In leprosy, as in other infectious diseases, morbid processes are determined largely by conditions of aptitude inherent in the individual. It is a question of soil as well as of seed: if the soil be unfavorable as a culture medium, the bacilli die of inanition. The only explanation of these spontaneous cures is that the tissues of such individuals are endowed with an unusual capacity of resistance to the germination and growth of the leprous bacilli. This capacity of resistance may be strengthened by change of climate and other measures, to be considered in connection with hygiene.

Treatment.—The verdict of experience is that leprosy is an incurable disease. Of the vast number of remedies and methods of treatment employed, none has proved to possess a specific action upon the leprous process. The resources of medical art are practically limited to measures of prevention and of palliation.

Prophylactic Measures.—The wisdom of the Levitical law, which decreed the separation of the clean from the unclean, has been sanctioned by the experience of centuries as the best prophylactic measure, although its practical working has in modern times been carried out with more discrimination and with less severity. There can be no doubt that if every leper on the face of the globe were removed from all contact or communication with the healthy, the disease would become extinct with the death of the present leper population. But isolation or segregation of lepers in special communities or hospitals, in order to be effective, must be thorough and complete. In countries where the compulsory segregation of lepers has been enacted by legislative authority, its thorough enforcement has been found to be impracticable. Even in the Hawaiian Islands, where the energies of the Government have for many years been directed to this end with all possible vigor, it has failed to accomplish the object. Doubtless these efforts have limited the spread of the disease, but the latter shows no signs of extinction.

The causes of this failure are probably due largely to the insidious character of the disease. In every country where leprosy is endemic a large number of persons are infected months and years before it is known to themselves or to others. Now, unless leprosy is devoid of contagious activity in the earlier stages, segregation of this class is absolutely essential to the effectiveness of the scheme. If such cases are contagious they are most dangerous, since their intercourse with family and friends is unrestricted by the wholesome disgust which the disease in the later stage always inspires. Again, many lepers present in their faces no visible signs of the disease, or they manage to conceal all convicting evidences for many years after it is developed. Such persons must be active spreaders of the contagion.

In this country, the compulsory segregation of lepers in lazarettos, as has been recommended by some of our health authorities, can scarcely be considered a necessary protective measure. Wherever leprosy has been introduced, except in the warm, moist climate of our Southern seaboards (Louisiana and Key West), it does not show an alarming tendency to spread and develop new foci of infection. Professional as well as public sentiment is opposed to the adoption of harsh coercive measures to crush out an evil which does not seriously menace the public health, but rather tends to die out from natural causes. If it were possible to stamp out the disease by isolating the comparatively few cases that exist in this country and exclude fresh ones, it might be considered a triumph of medical prevision. But no system of quarantine has ever been devised which will effectually exclude the importation of a disease so insidious in its development and so little manifest on ordinary inspection as leprosy.

Observation shows that if a leper lives by himself, with separate room, bed, board, etc., and does not come in intimate contact with others, he is practically innocuous so far as contagion is concerned. In cases where such conditions can not be complied with, he should be placed in a hospital or asylum specially provided for this class of patients. Wherever he may be placed, the leper himself, as well as his habitation, should be kept scrupulously clean. In view of the fact that contamination probably takes place from the buccal or nasal secretions, these should be disinfected or destroyed with the same scrupulous care as would be indicated in a case of tuberculosis.

Hygienic Measures.—Prominent among the means which experience has shown to most favorably influence the leprous process are good hygienic conditions. The individual capacity of resistance should be strengthened by all measures calculated to build up and maintain the general health at the highest possible standard. The most favorable conditions comprise residence in a temperate climate, well-ventilated rooms, freedom from exposure to damp and cold, care of the skin by frequent warm baths, massage, and warm clothing, exercise in the open air, an abundance of nutritious food, fresh meat and vegetables, etc. Baths should be especially insisted upon in the ulcerative period, when, the action of the cutaneous glands being suppressed, the skin becomes dry, fissured, and covered with the products of the suppurative lesions.

General Medical Treatment.—Of the large number of remedies which have from time to time been vaunted as cures for leprosy very few retain at the present day any degree of professional confidence. The two remedies which stand highest in general professional esteem are chaulmoogra and gurjun oil; they are used both internally and externally. Chaulmoogra oil, expressed from the seeds of the *Gynocardia odorata* was first used by Le Page, of Calcutta, in the treatment of leprosy. It is given in doses varying from five to eighty drops three times a day, in emulsion or in capsules. The best results are obtained when large doses, two hundred to three hundred minims daily, are administered. Unfortunately, the oil is very irritant to many stomachs; some can not tolerate it even in the smallest doses. I have a patient in whom a dose of two or three minims invariably causes anorexia, disagreeable eructations, and sometimes vomiting. In cases where the oil is not well supported, Vidal has recommended its active principle, gynocardic acid, in the form of gynocardate of magnesia or soda, given in capsules, containing twenty to thirty centigrammes. Of these, ten to twenty may be taken each day. Externally chaulmoogra oil may be used in the proportion of one part of the oil to five or fifteen parts of olive or cocoanut oil, or in the form of an ointment of gynocardic acid. Under the prolonged use of chaulmoogra oil it is claimed that there is a notable amelioration of the symptoms—the skin becomes soft and supple, discolorations clear up, leprous nodules undergo involution, ulcers heal, disorders of sensibility are corrected, and the patients gain in weight. Other observers, after an extensive trial, have not been impressed with the value of this remedy.

Gurjun oil, derived from the *Dipterocarpus turbinatus*, first recommended by Dr. Dougall, has a high repute in India. It may be given in an emulsion, equal parts of the oil and limewater, the dose of which is from two to four drachms. As a local application it may be used in the proportion of one part of the oil to three parts of limewater or olive oil. To secure the best results the oil should be rubbed in thoroughly, two hours each day being employed in the process, after which a bath should be taken, and the inunction repeated every day. Dr. Hillis states that the gurjun oil seems to exert a specific action on the sweat glands, evidenced by the increased perspiration and return of sensation in anæsthetic areas, and that it is a most valuable agent in all forms of leprosy.

Reports of cures by gurjun oil have been furnished by numerous observers. On the other hand, Drs. Beaven Rake and Vandyke Carter depreciate its value, declaring that the results are disappointing.

Cashew-nut oil (*Anacardium Occidentale*) and Kouté oil (*Hydrocarpus Wightiana*) have been employed with variable results. Salicylic acid and salicylate of sodium have been extensively used. Daniellsen states that these remedies are effective in both forms of leprosy. In the tubercular form the fever is lessened, the eruptive period is shortened, and new nodules disappear. Bidenkap has seen more harm than good from the use of salicylic acid; he thinks carbolic acid and creosote equally powerless.

Salol has been highly extolled by Lutz. In large doses he claims that the leprous fever is arrested and the eruption retrogresses with healing of the ulcers. Anæsthetic patches again become sensitive, and the "scaly, shiny appearance of the skin gives way to a moist, healthier look." Dr. Cook, the Superintendent of the Government Leper Hospital of Madras, after an extensive experience with this drug, declares that "salol, in my opinion, is of no therapeutic value in leprosy—in fact, I consider it a decided failure."

Hydrocotyle Asiatica was introduced by Dr. Boileau, himself a leper, who claims to have cured himself and many others with this drug. From its stimulating effects on the circulation it is considered by others to have a good effect in the anæsthetic form of the disease.

Arsenic has been highly recommended as a neuro-tonic in the anæsthetic form. The extract of nux vomica, or its principle, strychnia, has been extensively employed, and with excellent results, in the treatment of leprosy in this country. Hoang Nan, iodide of potassium, quinine, cod-liver oil, and sulpho-ichthyolate of sodium are among other drugs recommended. Mercury is by common consent regarded as harmful to lepers.

Unna claimed remarkable curative results from the external use of certain reducing agents, as resorcin, ichthyol, chrysarobin, pyrogallol, salicylic acid, etc., combined with the use of ichthyol internally. He asserts that the reducing agents are most efficacious when employed in a weak form. In some cases strong ointments of chrysarobin or plaster mulls, containing forty parts each of salicylic acid and creosote, are applied to the leprous nodules with a view of exciting an inflammation of the skin, which effects an elimination of the micro-organisms. A more extensive clinical experience has not confirmed the value of this method of treatment.

It will be observed that there is a most woful lack of unanimity of opinion as to the merits of any of these various remedies. In countries where leprosy is endemic it is difficult to subject the patients to a course of treatment sufficiently prolonged to judge of its value. Most lepers tire of systematic treatment. In the last report of the resident physician at Molokai to the Hawaiian Board of Health, Dr. Swift says the scientific treatment of leprosy can not be carried out at this settlement, because not more than ten per cent of the patients will continue the treatment for six months. An appreciation of the value of drugs is also confused by the frequent spontaneous subsidence of the symptoms, and it is difficult to estimate the part contributed by treatment to this result.

Most lepers who come to this country get better, for a time at least, without any medication whatever; and when treatment is employed it is difficult to differentiate between its effects and that of climate and improved modes of living. Thus, a patient from Brazil, the subject of pronounced tubercular leprosy, referred to me about eighteen months ago by Dr. E. L. Keyes, was placed upon the use of large doses of chaulmoogra oil internally, and inunctions of gurjun oil, with hot baths. In a few months the tubercles entirely disappeared from the face and body, the blotches faded out, and sensibility returned in anæsthetic areas. With the exception of lepromatous infiltrations of the nose and larynx, which still persist, there are no visible signs of the disease, and the patient imagines himself cured. It is impossible to determine what precise measure of curative influence should be attributed to the chaulmoogra oil, since in another case under my observation, in whom there was a complete arrest of all symptoms, the patient could not take the oil, and was given phosphide of zinc and strychnia. In still another case the symptoms subsided spontaneously without any treatment.

Of the several drugs which have been considered, chaulmoogra oil and strychnia give, according to my observation, the best results. The former is chiefly indicated in the tubercular and mixed types, the latter in the trophoneurotic cases; they should be given in large doses.

The external use of linseed or cod-liver oil would probably be followed by equally good results as have been claimed from the use of gurjun or chaulmoogra oil, the chief benefit, in my opinion, being derived from the two hours' vigorous rubbing daily required in their inunction.

Electricity I have found most serviceable in restoring impaired or lost sensibility in anæsthetic areas. This effect was brilliantly manifest in a case under my observation in which there had been for two or three years entire loss of sensation in a patch covering the entire instep of the left foot.

Surgical Treatment.—The individual lesions of leprosy should be treated on general surgical principles. The existence of leprosy is no contra-indication to any operation, as the tissues heal with remarkable facility, owing, as has been suggested, to the excess of fibrin. Tubercles may be excised, ulcers scraped, deep incisions made, necrosed bones removed, and amputations performed with the certainty of more or less prompt cicatrization.

I have a number of times excised tubercles or destroyed them with caustic potash, and the wounds healed kindly. Circumscribed masses of tubercles may also be curetted or excised. Unfortunately, the neoplasms are apt to return in a few weeks or months in the skin around the cicatrices. Free incisions down to the bone, in perforating ulcers and sinuses leading to dead bone, give great relief from pain. In deep ulcerations of the lower extremity, which interfere seriously with the patient's comfort and locomotion, the gangrenous flesh should be cut away, necrosed bone removed, and the parts dressed aseptically. Amputation may be employed in gangrene of the fingers and toes, giving a better result than the spontaneous amputation of nature.

Nerve stretching, for the relief of distressing neuralgia and pain along the course of nerves, and healing perforating ulcers in areas supplied by the nerves, has been practiced by Beaven Rake, Neve, and others with good results.

The ocular lesions of leprosy are very common and most distressing. Leloir noted that of sixty-four lepers at Molde, in Norway, forty-one had ophthalmic lesions—thirty-seven in both eyes, while six were entirely blind. When there is an invasion of the cornea, Daniellsen and Boeck arrested the progress of the tubercles by cauterizing the conjunctiva or cornea around the tubercles. Kaurin performed keratotomy for the same purpose. Ligation of the vessels supplying the tubercles has been successfully done. Various delicate operations have been successfully performed with the object of correcting the epiphora and other disagreeable symptoms which result from the paralysis of the orbicular muscle and consequent inability to close the eyelids. For paralytic ectropion Kaurin performs tarsorrhaphy of the inner third of the eyelids, thus raising the lower lid and permitting their occlusion. Iridectomy has also been employed in cases where total blindness is threatened.

The lesions of the nose, mouth, and throat, the secretions from which emit a most offensive odor, especially in the ulcerative stage, and are most deleterious to the patient from being constantly swallowed, should be treated with medicated sprays, antiseptic douches, or with caustics. Tracheotomy has been repeatedly performed for dysphagia and stenosis of the larynx, due to invasion of leprous neoplasms. In Norway, Abraham observed one patient who had worn a tube for three years, another seven years, and another ten years. In other cases the larynx had become functionally useful and the tubes were discarded.

The visceral complications of leprosy which ordinarily supervene at a more advanced stage, such as bronchial, renal, and gastro-intestinal disorders, should be treated symptomatically.

The treatment of leprosy by injections of *tuberculin*, which was introduced a few years ago, is mentioned only to be condemned. The results have not only been invariably disappointing so far as improvement is concerned, but the action of tuberculin is positively pernicious, in setting free the bacilli in the tissues and determining the development of new foci of the disease.

MORVAN'S DISEASE. (S. Pollitzer.)

Synonyms: Syringomyelia; Myelosyringosis; Fr., Panaris analgésique; Maladie de Morvan; Ger., Morvansche Krankheit.

Definition.—Morvan defined the disease as "paresis, with analgesia of the upper extremities—at first on one side, then on the other—ending always in the production of one or more whitlows." Later experience has shown that this definition requires some modification.

Symptomatology.—The disease is insidious in its development. The first noticeable symptoms are generally pain in the affected arm and some loss of muscular power. In some cases the disease begins with a succession of whitlows; in others, analgesia is the first symptom, the patient's attention being attracted to his condition by the fact that burns or other injuries of the part are painless. Whatever the order in which they develop, all these symptoms are sure soon to appear. The paresis is soon followed by atrophy of the muscles of the thenar and hypothenar eminences, the interossei, and frequently some of the muscles of the forearm, chiefly on the flexor side. The sensory disturbances are limited to analgesia and thermo-anæsthesia (as a rule, equally to heat and cold), affecting the fingers, hand, and forearm, and rarely the shoulders and neck; the areas of analgesia and thermal anæsthesia usually coincide, but sometimes the latter extends slightly beyond the limits of the analgesic region. Tactile anæsthesia occurs in some cases, and it may be complete or partial.

The vasomotor and trophic disturbances are the most striking. The skin of the affected member is generally of a bluish or mottled appearance, its temperature is lower than that of the healthy side, and there may be mild hyperidrosis of the affected area. The skin of the palm is frequently thickened, and fissures occur which lead sometimes to ulceration so deep as to involve the tendon sheaths. Vesicles and pemphigoid bullæ are not infrequent, and are—certainly in part at least—the result of accidental burns. The whitlows are, as a rule, painless, though the first may be painful. They vary in number, from two to six being the rule, but in one of Morvan's cases there were nine. They appear at irregular periods, sometimes in rapid succession, sometimes at great intervals; in one case twenty years elapsed between the appearance of the first four whitlows on one hand and of the last four on the other. They are accompanied or followed by necrosis of the phalanges, and lead, with the fissures, thickening, and contractures, to great mutilation of the hand. In one case a fracture of both bones of the forearm was caused by a very slight muscular effort. Scoliosis is present in a large number of cases, and affections of the shoulder joint, hydrarthrosis, dislocation, and rugosity of the head of the humerus have been observed. In all these cases the reflexes were present, but in others they were variable, being sometimes increased, sometimes diminished or absent. Contraction of the field of vision has been noted in many cases. The course of the disease is extremely chronic, and, though the symptoms usually develop rapidly at first, there may be no extension of the process for many years. In one case (Prouff, Gaz. Hebdom., 1887) the disease appeared at the age of twelve, and lasted for forty-six years. Recovery, or at least marked improvement, has occurred in some of the cases. The disease is more common in men than in women, about sixty-five per cent of the cases having been males.

Pathology.—Several years had elapsed since the publication of Morvan's first paper in 1883, and a number of cases had been observed, before any anatomical studies of the conditions underlying the disease were made. In 1888 Gombault (Monod and Reboul, Arch. Gén. de Méd., 1888, ii) examined an amputated finger, and found well-marked neuritis, great thickening of the fibrous lamellæ, the nerve fibers destroyed, and no trace of myeline. In 1889 the same author (Gaz. Hebdom., 1889) made the first post-mortem examination in the case of Prouff's patient (*vide supra*). He found a diffuse sclerosis of the peripheral nerves, and a sclerosis of the posterior columns and horns of the spinal cord at the cervical enlargement; the central canal was distended by fluid and round cells, and a cavity occupied the space of one posterior horn throughout a considerable region of the cord. In 1890, Joffroy (Arch. de Méd. Expér., 1890), in a post-mortem on a typical case, found neuritis of the median and radial nerves, and a cavity in the cord extending from the lower limit of the medulla to the mid-dorsal region. In another post-mortem, in 1891, the same writer found similar changes.

These observations confirmed the view previously expressed by Roth (Arch. de Neurol., 1887–'88), who, arguing from clinical grounds, maintained that Morvan's disease was identical with syringomyelia. This view was adopted by Charcot (Progrès Méd., 1890, ii), who, in an interesting lecture on the subject, speaks of the disease as *syringomyélie—type Morvan*. The identity of Morvan's disease with syringomyelia is now quite generally acknowledged, though Morvan himself still insists on their differentiation. There probably would never have been any question in the matter if the clinical features of syringomyelia had been as well known ten years ago as they are to-day. The typical cases published by Morvan himself show in their clinical features not less divergence from each other than there exists between them and typical syringomyelia. In fact, we should, *a priori*, expect to find great differences in the clinical features of different cases of a disease like syringomyelia, which depends on an indefinite lesion of the cord. The sensory disturbances predominate, the sensory anæsthesia is complete or partial, the trophic changes are most marked, or, finally, there will be an infinite variety in the degrees to which all these symptoms develop, according as the underlying lesion in the cord occupies a greater or less extent, or engages its central, anterior, or posterior regions.

As to the origin of the cavity in the spinal cord, there seems to be little doubt that it results from the degeneration and absorption of sclerotic (gliomatous) tissue. In sections of the cord the cavity is always bordered by a more or less extensive zone of gliomatous tissue, which may extend to distant portions of the gray matter, and involve even the white substance. The glioma can generally be followed for some distance in the cord below and above the limits of the cavity. The most common seat of the cavity is in the gray commissure just behind the central canal, the posterior horns, and the posterior columns; the anterior commissure, the anterior horns, and the lateral columns are rarely affected. As to the origin of the gliomatosis, it appears not unlikely in many cases that a congenital defect in the central canal, producing changes in the posterior commissure and the neighboring tissue, may be its starting point. It is not impossible, however, that the central changes may be secondary to an ascending process in the peripheral nerves (cf. Sachs and Armstrong, N. Y. Med. Jour., April 30, 1892). Certainly in some of the cases there has been a distinct history of traumatism antedating the development of the symptoms.

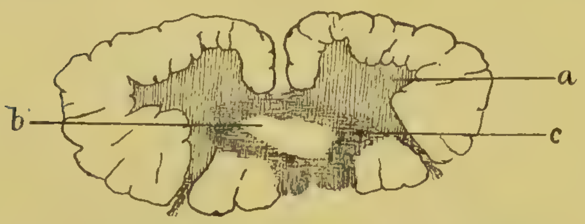


FIG. 57.—Syringomyelia, the cavity occupying the gray matter and posterior columns (after Westphal). *a*, gray matter; *b*, cavity; *c*, sclerotic tissue.

Diagnosis.—The diagnosis of a typical case of advanced syringomyelia can not under most circumstances present much difficulty. The whitlows, the dissociation of sensory symptoms, the muscular atrophies, the limitation to one or both upper extremities, and the extreme chronicity of the process, are fairly characteristic. In countries in which leprosy is endemic the diagnosis between it and syringomyelia may occasion some difficulty. Zambaco, of Constantinople, insists, in fact, on the identity of these two diseases, regarding syringomyelia as a degenerate form of leprosy, modified by peculiar hygienic conditions and by civilization. Such an opinion could be held only by one who completely ignores the results of pathological anatomical investigations. The reader is referred to the article on Leprosy for a fuller exposition of the differential points in diagnosis between these two diseases. It may be here stated, however, that a mistake in diagnosis would be apt to occur only where exclusive attention is paid to the hand symptoms; in leprosy there will always be some symptoms, such as pigmentary changes, affecting the trunk and lower extremities, that never occur in syringomyelia. Charcot, in the lecture referred to above, has taken the trouble to enter into the differential diagnosis between Morvan's disease and scleroderma. It appears to us, however, that it is far more difficult to find points of resemblance between the two diseases than points of difference.

The **treatment** can, of course, be only palliative. The whitlows and ulcerations must be treated on antiseptic surgical principles, and the anæsthetic member protected as far as possible from injuries. The patient should, of course, be placed under the best possible hygienic conditions, and his general health maintained *ad maximum*. Electricity may be tried.

COLLOID DEGENERATION OF THE SKIN. (S. POLLITZER.)

Synonyms: Colloid Milium (Wagner); Colloidome Miliare (Besnier); Hyalome (Auspitz, and Vidal and Leloir).

Definition.—An affection characterized by the occurrence of small nodules in the face, due to circumscribed colloid degeneration of the connective tissue of the derma.

Only about half a dozen undoubted cases of this interesting affection have been reported. It was first described by Wagner in 1866 (Arch. d. Heilk.); the most important work on the subject has been done by Besnier (An. de Derm. et de Syph., 1879 and 1885; also note in Kaposi-Besnier, vol. ii, pp. 240 and 370).

Symptomatology.—The lesions occur on the upper part of the face, especially around the orbits, on the forehead, nose, and cheeks. In one of three cases reported by Liveing the lesions appeared also on the neck and arms; but no microscopic examination was made in any of Liveing's cases, and there is good reason for accepting the diagnosis of colloid milium with considerable hesitation in the absence of such examination. The papules are but slightly elevated above the level of the skin, from a pin's head to a lentil in size, of a peculiar glistening transparency (suggesting vesicles), lemon-yellow in color, irregular but round in outline, uneven on the surface, sharply circumscribed. Sometimes two or more lesions coalesce, but the individual papules nevertheless remain distinct. Sometimes they are surrounded by dilated blood-vessels, but never sufficiently to give them an erythematous hue. Frequently they become depressed in the center, slightly umbilicated, and gradually disappear, leaving a shallow depression. In one of Liveing's cases some of them became inflamed and covered with a scab, leaving ultimately an ill-defined scar. If the little tumor be incised, a small, colorless, or slightly yellowish gelatinous mass may be extruded, but there is never any pus or fluid other than a droplet of blood. The gelatinous matter has all the negative characteristics of colloid matter. The disease produces no subjective symptoms whatever, nor is there any noticeable change in the general health. It affects adults, men and women equally, the limits of age in the observed cases being sixteen and fifty-four years.

Anatomy.—The anatomy of the disease has been studied by Balzer (Besnier's and Feulard's cases) and Reboul (Perrin's case). Wagner, who did not examine the skin histologically in his case, was of the opinion that it was the sebaceous glands which underwent colloid degeneration, and thought there was an analogy between this disease and ordinary milium. Balzer, who was the first to examine an undoubted case of colloid degeneration of the skin, found that the glands were unaffected, the changes being limited to the connective tissue of the derma, the fibers of which had become altered over large areas into the peculiar, glistening, homogeneous substance known as colloid matter. Connective-tissue bundles throughout the corium, as well as those immediately surrounding blood-vessels and nerves, were the subject of colloid degeneration. These observations, which were confirmed by later studies on other cases, led Besnier to reject the name colloid milium, and to propose "colloid degeneration of the skin," or "miliary colloidoma." Philippson, of Hamburg, in an interesting paper published in 1890 (Monatsh. f. p. Dermat., xi), attempted to show that colloid degeneration of the skin and hydradenoma (multiple benign cystic epithelioma) were identical. Besnier, who is familiar with many examples of these classes of cases, denies any relationship between them. In hydradenoma there are groups of (probably embryonically displaced) epithelial cells in the corium, which undergo colloid (or sometimes horny) degeneration in the middle of each group of cells. It is the disease which Kaposi erroneously interpreted as lymphangioma tuberosum multiplex. In colloid degeneration of the skin epithelial structures are not affected; there is no neoplasm, but simply a degeneration of previously normal connective tissue.

Etiology.—As to the cause of this degeneration we know nothing. In Wagner's case the patient suffered for some time before the appearance of the lesions from severe headaches. There were daily neuralgias in Besnier's case. In most of the cases the patients were habitually much exposed to the elements. Wagner's patient was a peasant, Besnier's a forester, Feulard's a gardener, and Perrin's (II. Int. Derm. Cong., Vienna, 1892) a ragpicker.

Diagnosis.—In the diagnosis of the disease, xanthoma, hydradenoma, and miliaria profunda (hidrocystoma) are to be considered. In xanthoma the plaques are usually of a deeper shade of yellow, like chamois skin; they lack the transparent, glistening appearance of colloid degeneration, and they are either strictly limited to the immediate neighborhood of the eyes (xanthoma planum) or else they are scattered over the entire body (xanthoma tuberosum)—and either distribution would oppose the diagnosis of colloid degeneration. In hydradenoma the lesions usually lack the yellowish hue of colloid degeneration; they are scattered all over the body, and they are congenital. In miliaria profunda the lesions have very much the same distribution and the same transparent vesiculoid appearance; the lesions are far more regular in outline, and they develop, moreover, only in the summer time. Pricking one of the lesions would remove any doubt. In miliaria profunda a drop of clear fluid will exude; in colloid degeneration a gelatinous mass may be forced out.

Some forms of lupus disseminatus seem to bear a considerable resemblance to colloid degeneration. Such, probably, was the nature of Fox's "Case of So-called Colloid Milium" (Jour. Cut. and Gen.-Urin. Dis., 1893), in which Elliot (ibid., p. 158) found giant and round cells, but no trace of colloid matter. The fact that pus oozed from the nodules incised alone argues strongly against the diagnosis of colloid milium.

The **treatment** should be directed toward correcting any constitutional disturbance, and locally removing the nodules by mechanical means, e. g., the dermal curette, electrolysis, etc.

ADENOMA SEBACEUM. (S. POLLITZER.)

Synonyms: Végétation Vasculaire (Rayer); Nævi Vasculaires et Papillaires (Vidal); Adenoma of the Sebaceous Glands; Ger., Talgdrüsenadenom; Fr., Adénome Sébacé.

Definition.—Multiple benign tumors of the face, consisting of adenoma of the sebaceous glands, frequently congenital.

About twenty cases of this disease have been recorded. The earliest cases by Rayer and Addison and Gull were not recognized, but have been identified recently from the descriptions given. Balzer was the first to recognize the anatomical characters of the disease. A typical case by Pringle appears to have directed attention to the disease, which there is reason to believe is not so rare as the paucity of the recorded observations would lead one to suppose. Balzer, Vidal, and Hallopeau have observed cases in Paris; Pringle, Mackenzie, Crocker, and Jamieson in Great

Britain; Caspary in Germany; and the writer (Jour. Cut. and Gen.-Dis., November, 1893) has had one case in New York.

Symptomatology.—The little tumors may be distributed all over the face, but they are most abundant generally at the sides of the nose and in the naso-labial fold. They are few in number on the forehead, somewhat more abundant on the cheeks and chin. Their distribution, as a rule, is quite symmetrical, but Crocker had a case in which the lesions were strictly unilateral; in Jamieson's case they were nearly so, and in my own case the tumors were arranged in a linear patch on one side of the forehead. The lesions in some cases were present at birth or appeared in infancy, but a more active growth, both as to number and size of tumors, has been noted at about the time of puberty. In Caspary's case they developed after the seventeenth year, in Jamieson's at puberty, and in mine in the thirty-first year. Minute telangiectasic vessels ramifying over them may give the growths a bright crimson hue; but they may have the color of the normal skin, or may appear slightly translucent, or may have a brownish-red tinge. The number and distribution of the dilated capillaries over them varies much in different cases; they may be wholly absent, or they may be so large and abundant as to give the appearance of an angioma. In my own case there was no telangiectasis; in Vidal's it was a marked feature. The epidermis over the little growths may be smooth, or it may have a rough and somewhat warty appearance. The individual growths rarely undergo any change after they have attained their development, though involution of a few of the tumors has been noted, leaving faint cicatrices. In Vidal's case and in mine there was cystic degeneration of a part of some of the tumors, giving the appearance of small, round, yellow nodules, from which, on incision, a little inspissated sebaceous matter could be squeezed. It is a remarkable fact that in most of the cases recorded there were other striking abnormalities of the skin. Warts, pigmented and hairy nævi, and small, pendulous fibromata, such as are met with in the skin of old people, have been noticed. In one of Pringle's and two of Crocker's cases there were patches on the back or above the iliac crest made up of groups of papules around the hair-follicles aggregated into a flat, irregular growth with numerous large comedones. The growths occasion no subjective symptoms whatever. It is, perhaps, only a coincidence that in many of the cases the patients have been of deficient intelligence, and some of them epileptics.

Anatomy and Pathology.—The most conspicuous feature in the histology of the growth is the enormous development of the sebaceous glands, which entirely fill the microscopic picture. The individual cells of the glands are not larger than normal—the condition is not one of hypertrophy—nor do they seem to have lost their function; in the middle of each enlarged acinus apparently normal sebaceous matter may be found. The epidermis is generally normal. In Pringle's case there was considerable interpapillary hypertrophy. Where telangiectases are present the dilated vessels will, of course, appear in the sections. The hair-follicles are generally rudimentary. Crocker believes that the sweat glands also undergo an "increased development." In my own case I found, besides the greatly increased sebaceous gland tissue, what looked like sections of the sweat-gland duct filled with colloid matter—a condition resembling the syringo-cyst adenoma of Török. In one of Balzer's cases there were numerous small cysts in the sweat glands besides the changes in the sebaceous glands. Crocker is of the opinion that the disease is due to a "congenital overgrowth of an adenomatous character developing from embryonic remnants in the skin, but affecting all the appendages, and therefore really a pilo-sebaceous hydradenoma." I can not agree with this view of the origin of the growths. Unless the acini had outlets, cystic degeneration would be invariable instead of being the exception; and if they have ducts opening on the surface, they do not differ essentially from normal sebaceous glands. I see no reason for assuming any other mode of origin than that of adenoma generally—

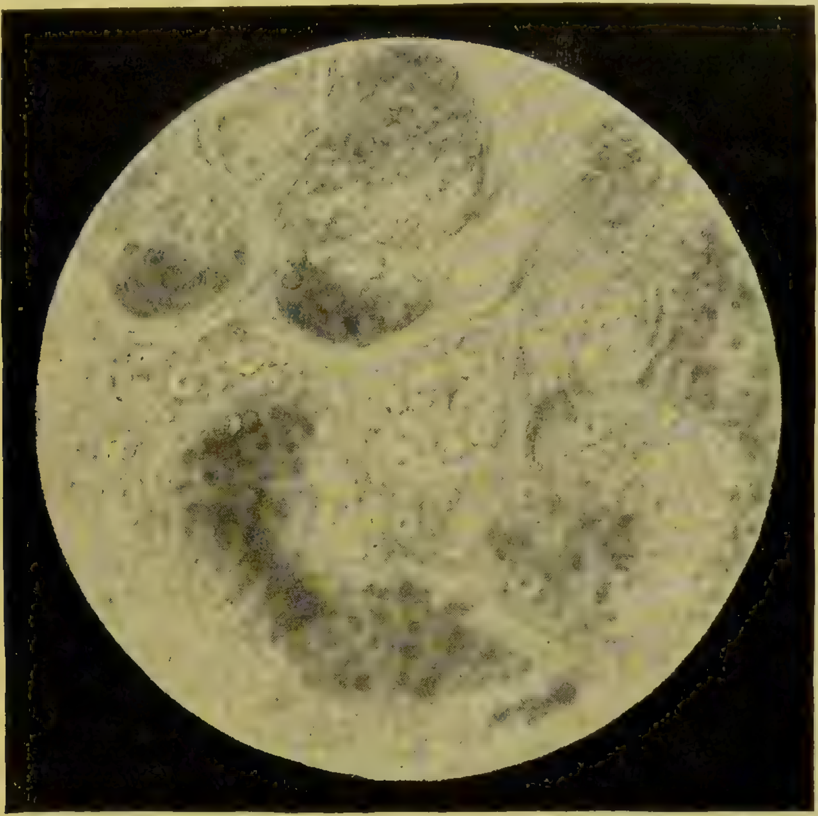


FIG. 58.—Adenoma sebaceum, author's case. The sebaceous gland cells are to some extent blackened by osmic acid.

namely, direct growth from pre-existing normal gland tissue. Serial sections may be necessary, however, to settle this point.

Etiology.—We know nothing as to the determinative cause of the growths. In many of the cases they were probably of congenital origin; in some of them they were certainly not. Nearly all of the cases have occurred among the poor, and many of them showed decided intellectual inferiority, but, as we have said, this is probably only a coincidence.

Diagnosis.—The occurrence of small, red, round, or obtuse, telangiectasic, discrete, solid papules, confluent, perhaps, along the naso-labial folds, affecting chiefly the middle of the face, appearing generally in early life and developing very slowly, will lead the trained dermatologist to suspect adenoma sebaceum. In *hydradenoma* the nodules occur also on the trunk and in the face; their seat of predilection is not the neighborhood of the nose. In *colloid milium* the lesions occupy chiefly the frontal and orbital regions; they are seldom numerous, and they have a peculiar translucent, yellowish appearance. Disseminated nodular lupus, in some aspects, bears a slight resemblance to adenoma sebaceum, but its nodules have a marked tendency to involution in their center, producing scar tissue, while spreading at the periphery. An absolute diagnosis of adenoma sebaceum, however, can hardly be made without a microscopic examination.

Prognosis.—In a few cases there has been a tendency to involution of some of the nodules; in some the number of little tumors has increased; but the rule is permanence after the growths are once established.

Treatment.—As neither internal remedies nor external applications can have any effect, the treatment is necessarily surgical. Hallopeau, by means of the curette and scarification, and Pringle, with the curette, have had but a slight measure of success. Excision with the knife is radical, but can not, of course, be carried out for all the tumors when they are numerous. Crocker was successful in a case in which the number of papules was not large with the use of electrolysis, a current of three or four milliampères being employed. In my case I obtained a complete cure (I saw the patient eight months later, and there was no recurrence) by means of scarifications repeated three times at intervals of two weeks.

ADENOMA OF THE SWEAT GLANDS. (J. A. FORDYCE.)

The affection which has been described under the various names of *hydradénomes éruptifs*, *adénomes sudoripares*, *syringo-cystadenome*, *adenoma of the sweat glands* (Perry), etc., formerly thought to have its origin in the coil-glands, has by later investigation (see article entitled Benign Cystic Epithelioma) been shown to have no connection with these structures. Although a wide difference of opinion exists among pathologists regarding the *rôle* played by the sweat glands in tumor formation, there are few well-authenticated examples of adenomata which can be directly traced to these organs. Virchow (Die Krankhaften Geschwülste, iii, Bd.) had never seen a single example of such a tumor.

Rindfleisch (Lehrbuch der patholog. Gewebelehre) found a flat, warty-like elevation of the skin to be on section a tumor originating in the coil glands. Peterson (Archiv für Dermat. und Syph., 1892, p. 919) reported a case of nævus verrucosus unius lateris, which proved on microscopic examination to be an adenoma of the sweat glands. He expressed the view that the tumor originated not from the fully developed gland, but from some disturbance in its embryonal development. In a later article (Beiträge zur Kenntniss der Schweissdrüsen-Erkrankungen, Archiv für Dermat. und Syph., 1893, p. 445), he concludes, from a further examination of the same case, that the tumor started from the ducts of the fully developed glands.

Elliot (Journal of Cutan. and Gen.-Urin. Dis., 1893, p. 168) found a similar pathological condition of the coil glands occurring in a nævus unius lateris of the shoulder, which has existed since childhood. Elliot preferred to give the name adeno-cystoma to the pathological condition which he found, there being no new formation of glandular tissue. He further believed the process to be secondary, and developed in consequence of the irritation to which the nævus had been subjected.

While it is not improbable that adenomata of the sweat glands may remain in a quiescent state for a long time before giving rise to malignant epitheliomata, there is very little proof, either in the clinical course or pathological anatomy of such malignant growths to show which ones had such a beginning.

Thiersch and Waldeyer have described primary cancer of the sweat glands, but the attempts which have been made by Cornil and Ranvier, Thin, and others, to prove that all tubular epitheliomata of the skin have such an origin have not been successful. Neither the shape, size, nor arrangement of the cells are sufficient criteria on which to base the diagnosis of sweat-gland epitheliomata.

Darier (Contributions à l'Étude de l'Épithéliome des Glands sudoripares, Archives de Méd. expérimental. et d'Anat. Pathol., 1889, pp. 115 and 267) has reported a peculiar case occurring in the service of Besnier, in which multiple, deep-seated, and painful tumors developed with great rapidity on the trunk of a man aged seventy-one. Darier's examination showed that each tumor started with a proliferation of the sweat-gland epithelium, which filled the lumen of the canal, broke through the membrana propria, and infiltrated the connective tissue. The author was able in medical literature to find but two similar cases, one of which was reported by Malherbe, the other by Creighton. In the latter case a dog was the subject of the affection.

The **diagnosis** of the obscure affection can, of course, only be made with the aid of the microscope.

Treatment.—Removal of the growths by means of excision, curetting, or the cautery, is the only method from which good results could be expected.

MULTIPLE BENIGN CYSTIC EPITHELIOMA. (J. A. FORDYCE.)

Synonyms: Hydradénomes Éruptifs (Jacquet and Darier); Syringo-cystadénome (Török); Adenoma of the Sweat Glands (Perry); Cellulome Épithélial Éruptif Kystique (Quinquaud); Gutartiges Epithelioma, verbunden mit kolloider Degeneration (Philippson); Cystadénomes Épithélieux bénins (Besnier); Epithelioma Adenoides Cysticum (Brooke).

Symptomatology.—Under these various titles a dermatosis has been described affecting the face, chest, back, and upper extremities, characterized by the presence of small, pale-yellow, pearly, or pinkish-colored tumors, varying in size from a pin's head to that of a pea. The

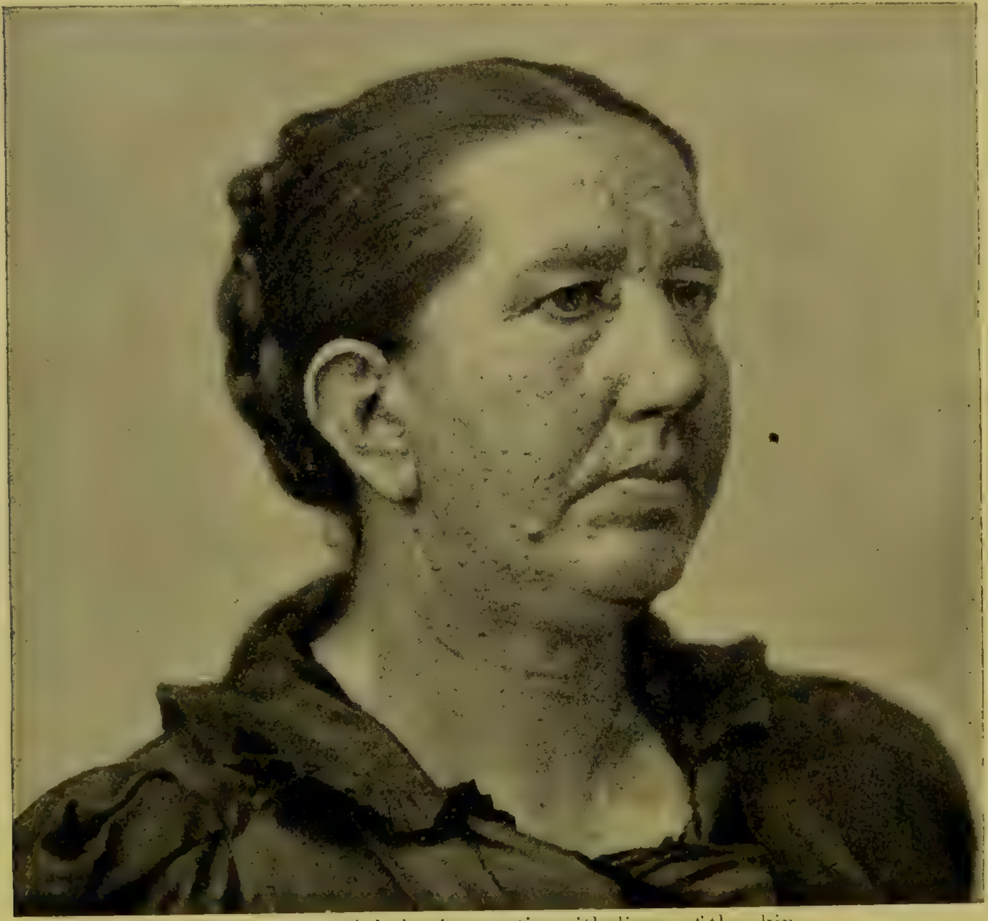


FIG. 59.—Multiple benign cystic epithelioma of the skin.

small growths are imbedded in the skin, and project above the surface. They are firm and painless to the touch, the larger tumors being tense, shiny, freely movable, and sometimes show a central depression. Some of the tumors are translucent, and closely resemble vesicles; others are made up of small, milium-like bodies, and are traversed by minute capillaries. In the cases reported the affection has been noted at or before the age of puberty. The tumors slowly enlarge until they attain the size of a pea, seldom exceeding this dimension, and never undergoing ulceration or spontaneous involution. No impairment of the general health results, nor do the growths give rise to any subjective sensations.

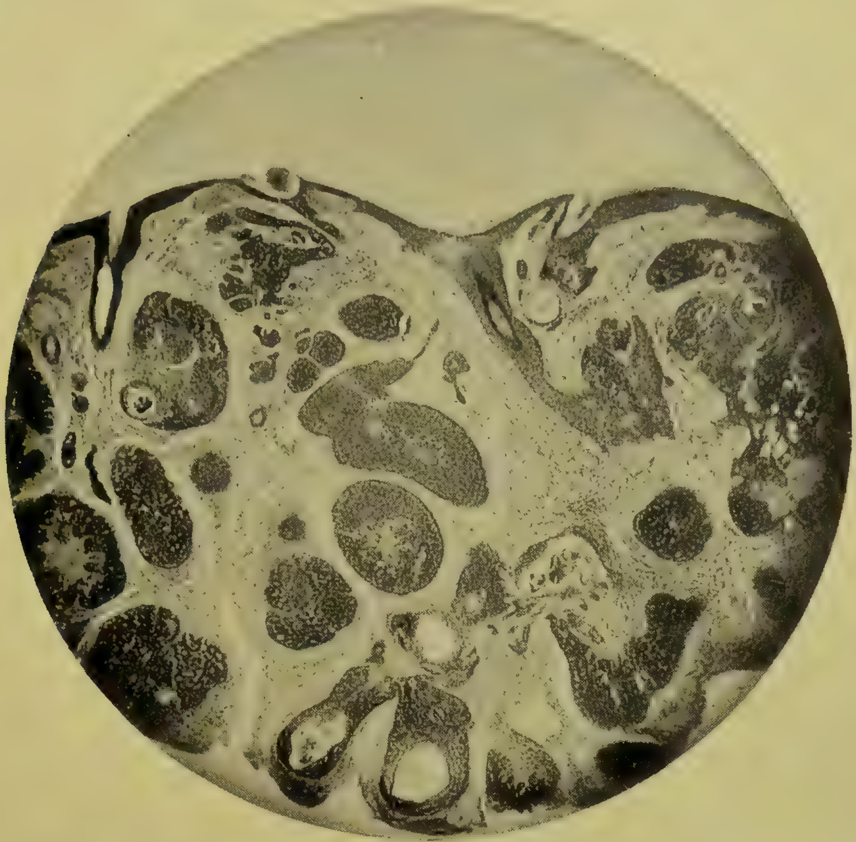


Fig. 60.—Section of an entire tumor, showing the surface depression and the arrangement of the cell masses in the cutis. In the lower part of the section cysts inclosing horny and colloid matter are seen. On the extreme right there is a down growth of the epidermis. × 30.

The entire course of the affection is so free from any evidence of malignancy that the word *benign* is necessary to qualify the term *epithelioma* used in this connection, which custom has associated with a malignant course.

Brooke (Brit. Jour. of Dermat., p. 271, 1892) reports the cases of a mother and two daughters affected in a similar manner with this curious eruption. In my own study of the disease (Jour. of Cutan. and Gen.-Urin. Dis., p. 459, 1892), a mother (Fig. 59) and daughter presented an identical eruption. The mother also stated that her father was affected in a similar manner, and later inquiry elicited the fact that her two sisters have an eruption which she states is like her own and her daughter's. The cases of Brooke and my own are the only ones among those reported in which a distinct hereditary history was determined.

Pathology and Morbid Anatomy.—Microscopic examination of the tumors in question shows them to be made up of irregularly rounded, oval, and elongated masses and tracts of epithelial cells corresponding to those in the lowermost layer of the epidermis and the external root-sheath of the hair-follicle (Fig. 60). The epithelial masses may be distinct, or made up of intercommunicating bands and tracts, in some places resembling coil ducts. Cell "nests" are met with as in malignant epithelioma, inclosing horny, granular, and colloid tissue. Colloid degeneration of individual cells is also encountered in the cell masses. The connective tissue about the cell collections is somewhat condensed, but is not the seat of any inflammatory process. A down growth and proliferation of the epidermis and external root-sheath of the hair-follicle was determined by Brooke and myself (Fig. 61). This fact, which served in some measure to clear up the uncertainty surrounding the origin of the epithelial tissue, had been missed by the previous investigators, some of whom (Jacquet and Darier) looked upon the tumors as epithelial adenomata originating in the sweat glands. Török adopted the view that the new growth originated from misplaced embryonic germs of these glands, which failed to develop in a normal manner. Later, Quinquaud and Jacquet were of the opinion that misplaced epithelial cells of an indifferent nature were responsible for the growths in question. This view was subsequently adopted by Darier and Philippson, and is now looked upon as the most plausible explanation of their origin.

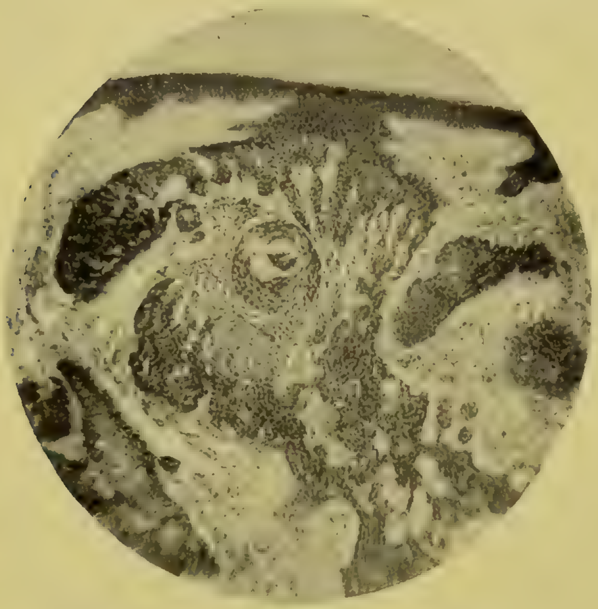


FIG. 61.—Showing origin of new growth from surface epidermis. × 60.

Treatment.—No application or internal medication has any influence in removing the growths. When the epidermis covering the tumors is incised, many of them may be readily expressed by slight pressure, as they are loosely attached to the surrounding tissues. If this method is not successful, the dermal curette can be employed. The little wound which remains readily heals with a slightly depressed scar.

LYMPHANGIOMA TUBEROSUM MULTIPLEX. (Kaposi.)

(J. A. Fordyce.)

Kaposi, in 1872, gave this name to an affection of which he had seen but a single case in Hebra's clinic. Several hundred tumors of the size of a pea, and smaller, were scattered over the trunk and neck of a woman aged thirty-two. She stated that they had existed since childhood, and had only increased in size during the past few years. The tumors were seated in the cutis, brown-red in color, somewhat hard, but attended with no subjective sensations. They closely resembled syphilitic papules, but nowhere showed a tendency to involution or scaling. The microscopic examination of an excised nodule, made by Kaposi and Biesiadecki, revealed a number of round or oval cavities in the cutis, which under high amplification were found to be lined with nucleated epithelium, and were regarded as sections of lymphatic vessels surrounded by condensed connective tissue. The glands and hair-follicles were found to be normal.

Pospelow (1879), Van Harlingen, Lesser and Beneke have described similar eruptions, which they regarded as identical with Kaposi's original case. Hoggan, Besnier, Török, Jacquet, and others have disputed the lymphangiomatous character of Kaposi's case and the others reported as such, believing them to be in reality cases of benign cystic epithelioma. Kaposi, in the last edition of his book (Pathologie und Therapie der Hautkrankheiten, Vierte Ausgabe, Wien, 1893), while admitting that the clinical and histological appearances of the two affections are similar, is not disposed to believe in their identity. The epithelial processes and collections of cells were not present in his case, and, from a comparison of the microscopic drawings accompanying the description of *lymphangioma tuberosa multiplex*, in Kaposi's book, with sections of *benign cystic epithelioma*, their histological identity would scarcely seem probable, unless we look upon the spaces described as lymphatic vessels as cavities from which epithelial cells or colloid matter have fallen out in the process of preparation.

While the clinical features of the two processes seem to agree in all essential points, their pathological identity must be regarded still as *sub judice.*

MULTIPLE BENIGN TUMORLIKE NEW GROWTHS OF THE SKIN. (J. A. FORDYCE.)

Schweninger and Buzzi (Internat. Atlas of Rare Skin Dis., v, 1891) first described this unusual eruption. The patient under observation was a married woman, aged twenty-nine, who noticed the tumors eight years before. They first appeared as small, white elevations on the back, becoming larger and more numerous. After some years they spread to the shoulder blades, arms, and chest. The tumors vary in size from a lentil up to a sixpence, and have a rounded contour. In color they are white, bluish-white, or even darker. By pressure many of the tumors could be forced into the underlying tissue, leaving a surface pit into which the growth returned when the pressure ceased. No subjective symptoms were present. On microscopic examination the affected tissue showed an almost complete absence of elastic tissue. In the surrounding healthy skin the elastic fibers were normal in appearance and number, but somewhat thickened at the margin of the diseased patch. The blood-vessels and appendages of the skin were surrounded by young round cells. The sebaceous glands were enlarged, and showed the development of new acini at the periphery of the older ones. In some tumors the new growth was largely made up of these enlarged sebaceous glands. The authors, however, regard the atrophy of the elastic fibers as the primary and essential disease, the development of the appendages of the skin taking place in order to restore the static balance caused by the primary atrophy or retraction of this tissue. The etiology of the affection is entirely unknown, and the various plans of treatment which were employed had little effect.

LEUCOKERATOSIS BUCCALIS. (J. A. FORDYCE.)

Synonyms: Leucoplakia Buccæ; Psoriasis Buccæ et Linguæ; Leucoma; Smokers' Patches; Ichthyosis Linguæ; Chronic Superficial Glossitis; "Plaques Opalines," etc.

Definition.—Under these various terms have been described localized and diffused changes in the mucous membrane of the tongue, of the cheek, and exceptionally of the gums, white or bluish-white in color, chronic in course, and prone to be followed by epithelioma.

Symptomatology.—In the second volume of this System, page 242, the leucokeratoses which occur as the result of syphilitic infection are described; it is not possible, in the majority of cases, to differentiate the syphilitic from the nonsyphilitic leucomatous affections of the mouth.

Bazin (1868) is generally credited with the first description of the affection, which he regarded as a psoriasis of the mucous membranes.

Some years before, however, Sigmund had referred to certain syphilitic changes in the mucous membranes under the name of "lingual psoriasis." Schwimmer (Vierteljahr. für Dermat. und Syph., 1877, p. 511) described the affection under the name of leukoplakia, and definitely separated the disease from psoriasis. An excellent clinical description of the chronic changes in the mucous membrane of the mouth will be found in Butlin's Diseases of the Tongue, p. 133 *et seq.*, and in Schwimmers's article (*loc. cit.*). Besnier and Doyon have critically considered the divergent views that have been held on the nature of the process in question. Although Schwimmer described dark-red spots or patches as the first manifestation of the disease, this stage is, as a rule, unobserved. The first departure from the normal to which the patient's attention is directed consists of a bluish-white or pearly colored patch or band of mucous membrane over the dorsum of the tongue. The affected patch is usually dry, rough, and sharply defined from the surrounding mucous membrane. The thickened epithelium may be removed or peel off, leaving a red, smooth surface which shows some tendency to bleed. The tongue at this stage is pliable, and not at all painful unless from the presence of superficial fissures.

The change in the mucous membrane may be general from the beginning, or be limited to a small patch which slowly spreads in a peripheral manner, while the altered epithelium becomes thicker and more opaque. The mucous membrane of the cheeks, corresponding to the line where the teeth meet when closed, is frequently involved at the time the disease makes its first appearance on the tongue. In the latter stage of the affection fissures and furrows sometimes form, and the patient complains of stiffness and dryness of the organ. Hypertrophy of the papillæ sometimes takes place, giving the tongue a warty appearance. If the causes which brought about the condition persist, the affected patch may be made raw and tender; otherwise it may escape the attention of the patient altogether. Marked soreness is seldom met with, unless the fissures be irritated by highly seasoned food or alcoholic drinks. In exceptional instances certain of the patches may spontaneously disappear. A single plaque may form and remain stationary for several months or years, when rapid extension takes place, either by direct enlargement of the primary lesion or by the confluence of a number of secondary ones.

The affection is interesting in this connection because tongues so affected show a great tendency to develop epithelioma. Butlin believes that the association of epithelioma has been underrated rather than exaggerated. Epitheliomata may originate from such plaques as a warty outgrowth from their surface, as a hard nodule beneath the mucous membrane, or an ulcer with indurated edges may be the first manifestation of the malignant process.

Pathology and Morbid Anatomy.—A difference of opinion exists as to whether the first change is in the epithelium or an inflammatory process in the papillary region. The latter view is probably correct, the hyperkeratosis being a result of the impaired nutrition of the epidermis rather than the cause of the underlying cell infiltration. The microscope reveals a marked thickening of the horny layer, the cells of which still preserve their nuclei. In places the papillæ are almost obliterated; exceptionally, however, the interpapillary processes show evidences of proliferation. There is always an inflammatory infiltration in the derma. Leloir's investigations showed that epitheliomata did not develop directly from the surface affected with hyperkeratosis, but from the exulceration resulting from the desquamation of the diseased epithelium, from secondary fissures or other lesions.

In the few cases of epithelioma in this connection examined by myself, the new growth belonged to the tubular epitheliomata, with little or no tendency to the formation of horny tissue.

Etiology.—Leucokeratosis is almost exclusively confined to the male, and generally occurs after middle life. It may exceptionally be met with in women, and occur as early as the twenty-first year. The combined influence of tobacco smoke and syphilis are the most potent agents in its etiology. Either may produce it, or it may exceptionally occur in individuals who are not users of tobacco, and who have never had syphilis. Undiluted strong alcoholic drinks, highly seasoned food, and the irritation from rough teeth or plates, have some influence in causing its development in predisposed persons. The irritation of early syphilitic lesions of the mouth by smoking and drinking is undoubtedly one of the most important etiological factors in its production, the resulting leucokeratosis being rather a result of the disease than syphilitic, *per se*.

Prognosis.—This is somewhat doubtful unless the case is seen early in its development, and the patient can be persuaded to abstain from the use of tobacco and irritating food and drink. There are abortive forms which spontaneously disappear, and in a certain percentage of cases no tendency to warty outgrowth or to the development of epithelioma takes place. The possibility of the occurrence of malignant disease should always be borne in mind.

Treatment.—The use of tobacco in every form is to be prohibited absolutely. Alcohol should also be given up. Diluted wines in exceptional cases may be allowed where the indications are present for their use. Acids, sweets, highly seasoned foods, as well as articles which are too hot or cold, should be interdicted. Every source of local irritation should be removed, and strict attention paid to the hygiene of the mouth. The affected parts may be painted with a solution of bicarbonate of soda, borax, salicylic acid, or chromic acid ten or twenty grains to the ounce. Strong caustics may do harm by producing too much irritation, unless applied with care to the fissures or abraded surfaces. A small and sharply defined patch can be removed by the knife, and success may result from the galvano, or Paquelin cautery when the disease is more extensive. When a syphilitic history is present, mercury and the iodides are, of course, to be given, but only exceptionally does benefit result from their use.

PSOROSPERMOSIS CUTIS. (M. B. Hartzell.)

It has been known for some time that certain unicellular organisms of the class of sporozoa may give rise to disease in the lower animals: e. g., the rabbit, in which a disease of the liver due to the invasion of the hepatic ducts by the *coccidium oviforme* (Leuckart) frequently occurs epidemically. In rabbits dying from this disease the liver is found to contain numerous white nodules varying in size from a hemp seed to a pea, and even larger, which contain in their interior numerous oval bodies, the *coccidia.* These organisms, known also as *psorosperms,* are round or oval in shape, surrounded by a thick, tough capsule, and contain a granular protoplasm, which at first fills the cell, but later, contracting toward the center, is surrounded by a clear space. They are parasitic, immobile organisms, living in the epithelial cells of vertebrates, and, owing to their tough membranous capsule, possess marked powers of resistance to various chemical reagents. Under proper conditions the coccidia undergo, within a variable period, a transformation, their contents dividing up into four oval spores. Beyond the facts above recited, but little is known of their life history. Delepine met with partial success in endeavors to cultivate psorosperms obtained from the liver of the rabbit in serum and gelatin, the former being apparently the better medium, but the attempts of Shattock and Ballance were followed by negative results. A few instances of visceral psorospermosis in man have been reported by Gubler, Eve, Silcock, and others, but it is only very recently that these organisms have been found to play any considerable *rôle* in human pathology.

In the Annal. de Dermat. et de Syphilig. for July, 1889, Darier, under the title of *psorospermose folliculaire végétante*, published a paper in which he announced that the rare disease of the skin hitherto known as *keratosis follicularis*, or *acne sebacée cornée*, was a cutaneous psorospermosis, psorosperms being present in great abundance in the lesions characteristic of this malady. A little later he also advanced the opinion that certain round cells found in Paget's disease are also psorospermia, and that this disease is likewise a form of cutaneous psorospermosis. Neisser and Darier both assert the parasitic nature of the so-called molluscum bodies which are so characteristic a feature of molluscum contagiosum, regarding them as coccidia. As early as 1876 Malassez had noted the presence of certain peculiar cells in various forms of epithelioma, and had recognized their probable psorospermial nature without, however, attributing to them any etiological significance.

Thus, according to Darier, there are at least three clinically distinct diseases of the skin due to psorospermial infection—viz., keratosis follicularis, molluscum contagiosum, and Paget's disease. We shall limit ourselves here, however, to a consideration of the first-named malady, since molluscum contagiosum and Paget's disease are discussed at length elsewhere in this volume.

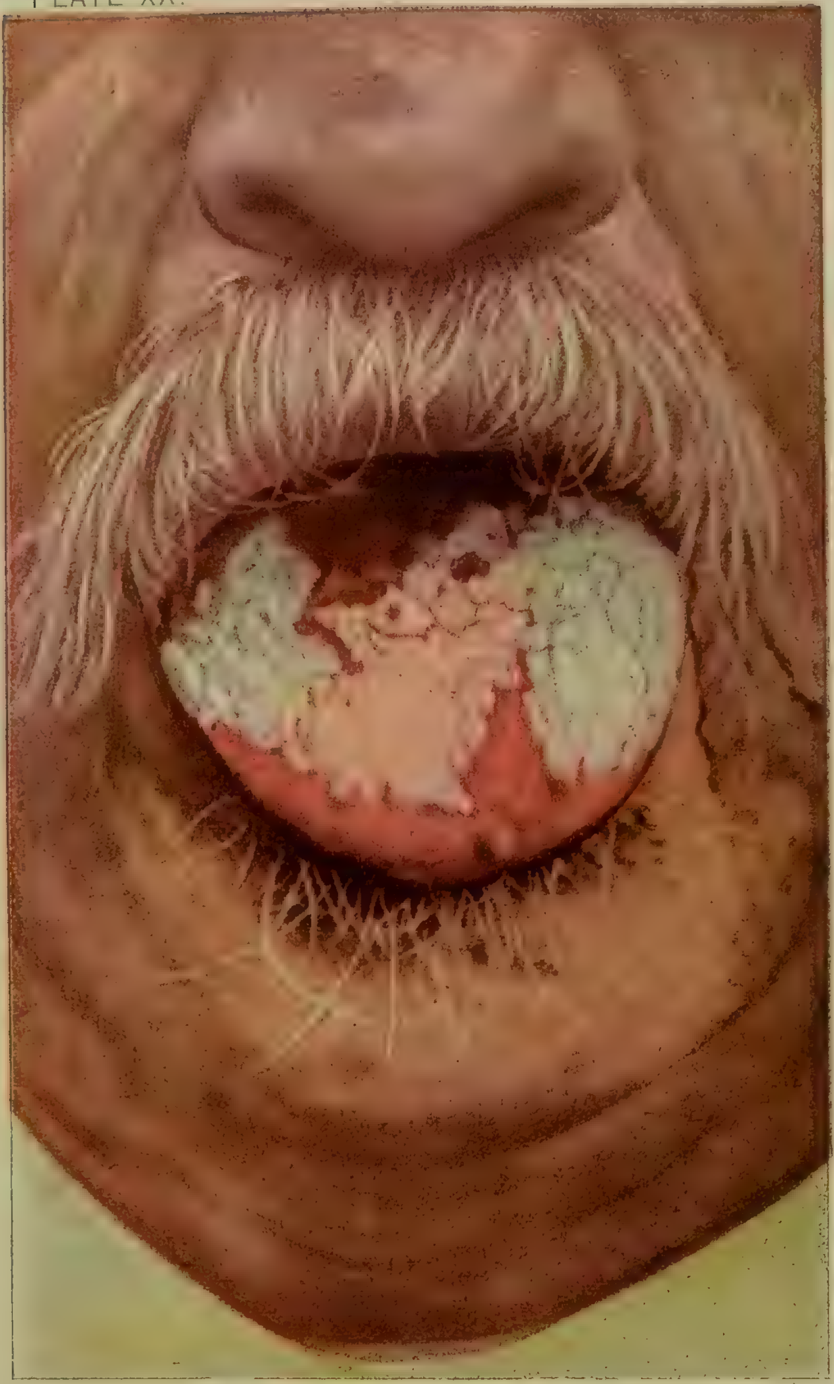
KERATOSIS FOLLICULARIS.

Synonyms: Ichthyosis Sebacea Cornea; Acné Sebacée Cornée; Ichthyosis Follicularis; Psorospermose Folliculaire Végétante; Darier's Disease.

Symptomatology.—This rare cutaneous disease, of which less than a score of cases have been reported, begins with the appearance of pinhead-sized solid papules, which do not at first differ in color from the surrounding skin, but as they enlarge they become slightly hyperæmic, and are covered with a hard, grayish, brownish, or blackish, firmly adherent scale, which, upon forcible removal, is seen to be in fact a horny plug imbedded in a funnel-like depression corresponding to the dilated mouth of the excretory duct of a pilo-sebaceous follicle.

While this eruption may be found upon all parts of the cutaneous surface, it occurs most abundantly, and usually begins, in certain regions, the places of predilection being the scalp, face, sternum, hypogastric and inguinal regions, reaching its greatest development in these last two localities. With the progress of the disease the lesions increase in size and number, in places becoming confluent, so that the skin is covered with a dirty-gray, brownish, or blackish layer of scales somewhat greasy to the touch, studded here and there with numerous spinelike projections, which vary in length from a few lines to one third or one half inch, forming in some instances veritable horns; as in the first case reported by White. In certain regions, as on the top of the feet, this horny layer may present the appearance of smooth, blackish plates elevated above the surrounding healthy skin. In the hypogastric and inguinal regions the lesions may attain a much more considerable development. In one of the cases reported by Darier they formed in these localities papillomatous masses of considerable size, which, macerated by perspiration, ulcerated and gave exit to an abundant sero-purulent fetid discharge. Similar papillomatous masses are described by White as occurring behind the ears in his first case. After removal of the horny scale covering the individual lesions, soft, sebaceous-looking matter may be pressed out, resembling somewhat the contents of the tumors of mollus-

PLATE XX.



Coloritype Co.

Leucokeratosis Buccalis (Chatelain).

cum contagiosum. Upon the scalp the disease may present an appearance not unlike an eczema, there being an abundance of greasy scales and small, thick, yellowish crusts, beneath which is a red, moist, uneven surface, in some instances having a verrucous appearance. The backs of the hands are covered with wartlike elevations having a solid, horny, translucent covering; these lesions may be so abundant as to become confluent, forming a continuous, rough, scaly plate. The palms and soles likewise, may be affected, though less frequently, and to a less extent. In one of Darier's cases these showed numerous yellow points caused by the thickening of the corneous layer over the papillæ. The nails are always involved to some degree in the morbid process, being more or less thickened and furrowed longitudinally, their free edges brittle and ragged. This condition of the nails Boeck found present, even when the adjoining skin showed no abnormality. In the axillæ, plaques covered with greasy masses of epidermis are sometimes present, which, owing to the maceration of the sweat, lack the horny consistence of the scales found on the lesions upon other parts of the body, and may be easily rubbed off, disclosing a moist, red, verrucous surface. This soft, greasy character of the scales may be present on other covered parts of the body, so that these, unlike the hard, rough covering found on the face, hands, and feet, may be readily wiped off with the finger.

Itching of a mild type is usually present, and, in consequence, the lesions are more or less excoriated by scratching. In those cases in which large vegetating lesions are present in the groin and between the nates, considerable pain is present, owing to the ulceration which occurs, and the patient's general health may suffer in consequence, though in the majority of cases this is little or not at all interfered with. The progress of the disease is, as a rule, slow, but acute exacerbations may occur from time to time, when new regions are invaded and numerous small papules make their appearance, which in time undergo the changes already described. In this manner the greater part of the cutaneous surface is, in the course of months or years, involved.

Pathological Anatomy.—The pathology and pathological anatomy have been studied by Darier, Bowen, Boeck, and Buzzi and Miethke, but it is to the first-named author that we owe the most elaborate account of its pathology and the parasitic theory of its causation. An examination of sections of the lesions with a moderate power shows that the pathological changes are seated chiefly in and about the mouths of the pilo-sebaceous excretory ducts. These are dilated so as to form funnel-shaped openings, and are filled with a mass of corneous cells continuous with the scale covering the papules, or projecting some distance beyond the level of the skin in the shape of small spines or conical horns. These plugs are composed entirely of cells which have undergone cornification, and are formed by an extraordinary thickening of the corneous layer of the epidermis. The rete mucosum is in general thickened, the cells of the basal layer are in a state of active proliferation, showing an abundance of karyokinetic figures; the prickle cells are apparently normal, except in the neighborhood of the lacunæ which are seen here and there over the papillæ. Here the cells have lost their characteristic prickles, and are scattered about irregularly, their nuclei staining but feebly or not at all. About the sides of the dilated follicular openings the interpapillary projections of the rete have undergone a considerable increase in length, extending some distance downward into the corium. In other places, owing to the pressure exerted upon it by the horny plugs, the rete is atrophied, being reduced to a few rows of cells. At the base of the horny plugs which fill the follicles, where they take their origin from the epithelial investment of the duct, are to be found large numbers of peculiar round or oval bodies, considerably larger than the epithelial cells, surrounded by a double-contoured membrane, and bearing some resemblance to cartilage cells (*vide* Figs. 62 and 63). These bodies contain a granular protoplasm which either fills the entire cell, or, what is more common, being retracted toward the center, is surrounded by a clear space. A nucleus and nucleolus are frequently present, although in many instances these are absent. Upon careful examination these bodies are seen to be within the epithelial cells, crowding the nucleus of the host cells to one side, flattening it out against the epithelial cell wall. While the tissue alterations are found chiefly

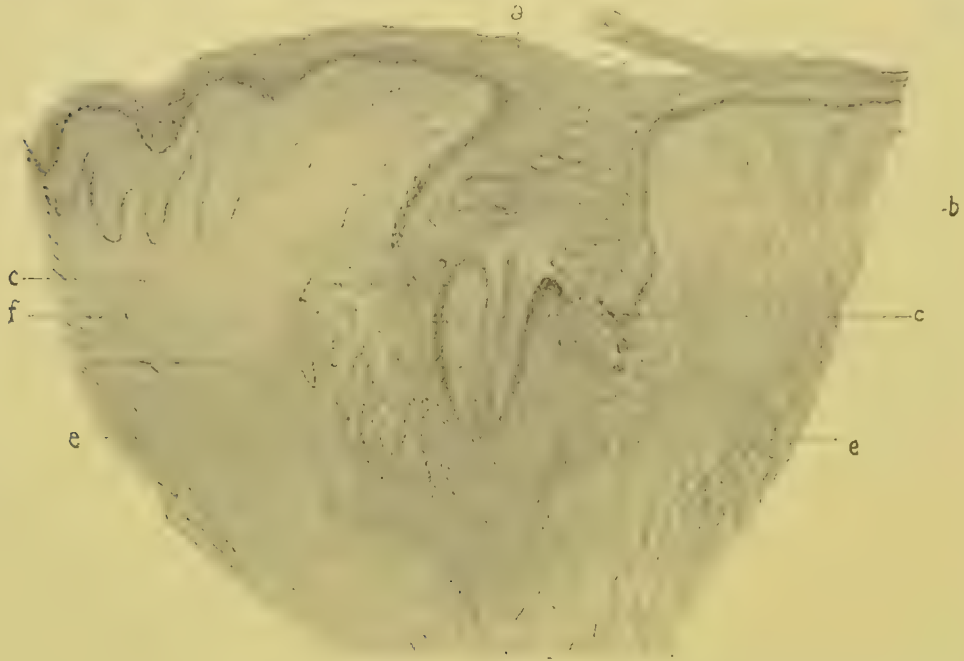


FIG. 62.—Section of a hair follicle from the back (Darier).
a, corneous layer; *b*, follicle filled with corneous material; *c*, *c*, psorosperms; *e*, *e*, papillary vegetations; *f*, hair, low power.

about the ducts of the sebaceous glands, this is not the exclusive seat of the disease, since papules occur unconnected with the sebaceous glands. In these latter lesions there is simply a thickening of all the layers of the epidermis, with a moderate increase in the length of the interpapillary projections. The same round, double-contoured cells are present within the epithelial cells, which have been described above as occurring at the base of the follicular plugs. In the inguinal and hypogastric regions (where the lesions may reach a considerable size) the pathological changes are often much more extensive than elsewhere. Darier found, upon examining lesions from this region, that the upper part of the sebaceous ducts was dilated to such a degree as to form cysts, from the sides of which numerous diverticula passed deeply into the corium, filled with vegetations ramifying in every direction, the whole presenting an appearance resembling an epithelioma having its origin in the follicle. The changes in the corium are slight, consisting in a moderate amount of round-celled infiltration, most marked in the papillæ and along the blood-vessels, with some pigmentation occurring as scattered granules or small masses. The glands of the skin are unaltered.

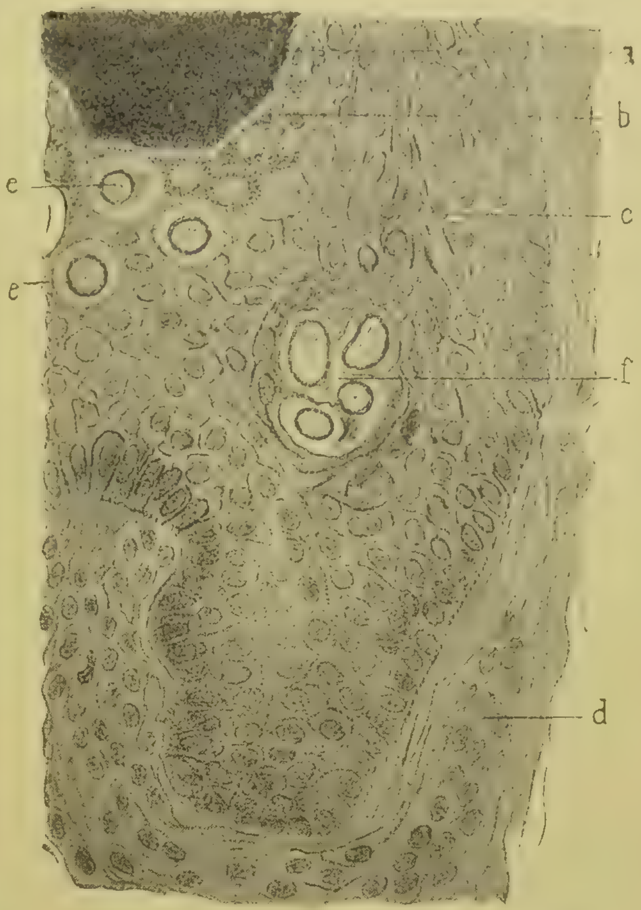


Fig. 63.—Epidermis in the neighborhood of a hair follicle.

a, stratum corneum; *b*, stratum granulosum; *c*, rete mucosum; *d*, embryonic cells in the corium; *e*, *e*, encysted psorosperms; *f*, a group of four psorosperms (Darier), moderate power.

Pathologically the malady is regarded by Darier as a follicular psorospermosis, hence the name given it by this author—*psorospermose folliculaire végétante.* The double-contoured cells found within the epithelium, as described above, are regarded as psorospermia, and the active agent in the production of the lesions characteristic of the disease. Thibault, Wickham, and Brocq likewise support this view. On the other hand, Bowen, Boeck, Buzzi, and Miethke, who have had the opportunity to study the lesions microscopically, are of the opinion that the so-called coccidia are not parasitic, but only examples of cell metamorphosis.

Boeck, who has had exceptional opportunities to study the malady, regards the presence of eleidin granules, noticed also by Bowen, and Miethke and Buzzi, as evidences of the epithelial origin of these bodies, and believes them only epithelial cells subjected to an abnormal process of cornification. Accordingly, the last-named authors look upon the affection as a hyperkeratosis. With our present knowledge, however, opinions based upon mere morphology should be accepted with some reserve, and until we know more of the life history of the coccidia, and by culture and inoculation experiments have determined the behavior of these organisms in the tissues of the lower animals, the question as to the real nature of the cells found in the disease under consideration, as well as in molluscum contagiosum and in certain epitheliomata, must remain undecided.

Etiology.—Leaving aside for the present, as not yet proved, the parasitic theory of the origin of the disease, we know comparatively little about its etiology. Sex seems to play an important *rôle* among the predisposing factors, since out of fifteen cases twelve were males. This number is, however, much too small to base definite conclusions upon as to this point. Age likewise exerts a determining influence upon the occurrence of the malady. Of fifteen cases, five began before ten years of age; five between ten and twenty years of age; three between twenty and thirty years of age; two between thirty and forty years of age; and twelve of the entire number began before twenty-five years of age.

Although no proof of contagion has yet been furnished, it must be noted that the two cases reported by White were members of the same family, being father and daughter, although they had not lived together for many years. It is still more remarkable that of Boeck's four cases three belonged to the same family. Facts like these point strongly in the direction of contagion or heredity, with the probabilities much in favor of the former.

Diagnosis.—The diagnosis of the fully developed disease presents few or no difficulties. In the early stages of the eruption the papules may bear some resemblance to lichen planus, but the peculiar horny plugs which occupy the mouths of the dilated follicles, and the presence of the larger vegetating lesions in the inguinal regions and anal cleft, are characters which make the distinction easy.

Prognosis.—The prognosis is extremely unfavorable, since the progress of the disease is steadily onward, new lesions appearing and the older ones increasing in size, so that large areas of the skin are eventually covered. In nearly all the cases thus far reported the affection had lasted for years without any evidence of spontaneous involution, and practically uninfluenced by treatment of the most varied kind. The patient's general health, however, is, as a rule, but little affected, although this may suffer through pain and loss of sleep arising from the ulceration of the inguinal lesions.

Treatment.—As may be inferred from the foregoing, the treatment is unsatisfactory; indeed, no remedy has yet been found which acts curatively, and very few which produce any considerable improvement. Even in the cases in which an amelioration of the symptoms followed treatment, the suspension of the remedy was promptly followed by a return to the former condition. Boeck found most benefit in his cases from the application of Lassar's paste and Unna's zinc gelatin. The verrucous lesions upon the back of the hands are favorably influenced by salicylic acid in collodion, twenty to thirty grains to the ounce. In the axillary and inguinal regions, where the oozing is abundant, a paste like the following is recommended by Boeck: Talc., amyli, āā 50; glycerin, 30; liq. plumbi subacetat. dil., q. s. ut. ft. past. M.

Ointments containing from five to eight per cent of pyrogallol were likewise found useful by this author. Crocker advises inunctions with soft soap, followed by baths of potassium sulphide, ℥ iv to thirty gallons. In view of the probable parasitic nature of the malady the employment of parasiticide ointments and lotions would seem to be indicated, having first carefully freed the skin from scales and crusts by means of prolonged alkaline baths and sapo viridis.

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MOLLUSCUM CONTAGIOSUM. (HENRY W. STELWAGON.)

Synonyms: Molluscum Epitheliale; Molluscum Sebaceum; Molluscum Sessile; Epithelioma Molluscum; Molluscum Verrucosum (Kaposi); Acne Varioliformis; Tumeurs Folliculeuses.

Definition.—Molluscum contagiosum is a disease of the skin characterized by pinhead to large pea-sized, rounded, semiglobular, pearl-like elevations, of a whitish or pinkish color, and having a semi-translucent appearance.

Symptomatology.—The usual seat of the eruption is the face; but not infrequently the growths occur upon other parts, more especially the neck, hands, and genitalia; the soles and palms are never involved. The lesions are always small in the beginning, consisting of pinhead-sized, waxy-looking elevations, usually rounded or acuminate; they gradually, in the course of days or several weeks, reach the size of small or large peas. They are sessile, and have a broad, rounded base; occasionally one or several tend to become pedunculated. The lesions are rarely numerous, the average case presenting from three to ten or fifteen. While acuminated or rounded at the first, as they develop they become slightly flattened, and somewhat umbilicated; in the central part of this depression or umbilication a darkish speck is usually to be seen representing the mouth of the follicle, out of which the cheesy or semi-solid contents may, upon a variable amount of pressure, be made to exude. The growths are firm at first, and may remain so throughout their course, gradually, almost imperceptibly, in fact, disappearing by absorption, without previous softening having taken place. Many of the lesions, however, sooner or later, tend to become soft and to break down and thus melt away. The course of a single lesion may exceptionally be comparatively rapid, but as more commonly the case it is slow and long-continued; having reached its full size it may so remain an indefinite time without undergoing change. The lesions are sluggish in character, and are, as a rule, unaccompanied by any active signs of inflammation. In those cases tending to break down, however, the inflammatory action may be more or less pronounced. Occasionally considerable underlying and surrounding suppurative inflammation is accidentally or in some obscure way set up, and the tumor thus cast off; in such instances a slight scar may be left. Ordinarily, however, no permanent trace of the disease remains. There are rarely any subjective symptoms, the lesions appearing and continuing throughout their course, with apparently no pain, itching, or burning. Those which become inflammatory accidentally, or by tendency to break down, may be slightly sore and painful. There are no constitutional symptoms. Some observers have noted these molluscum tumors occasionally to be associated with warts; I have never encountered this association.

The most frequent site for the disease seems to be the face, although no part is exempt except the palms and soles. The tumors have even been observed (Colcott Fox) upon mucous membrane. Exceptionally, instead of a comparatively small number, the tumors may be numerous, consisting of from fifty to one or more hundreds, and distributed irregularly over the greater part of the entire surface. In other cases the lesions are crowded closely or even bunched together in groups of three or more. While the size of an average lesion is that of a medium-sized split pea, in exceptional instances a single tumor has been observed as large as a fist or an orange (*molluscum giganteum*).

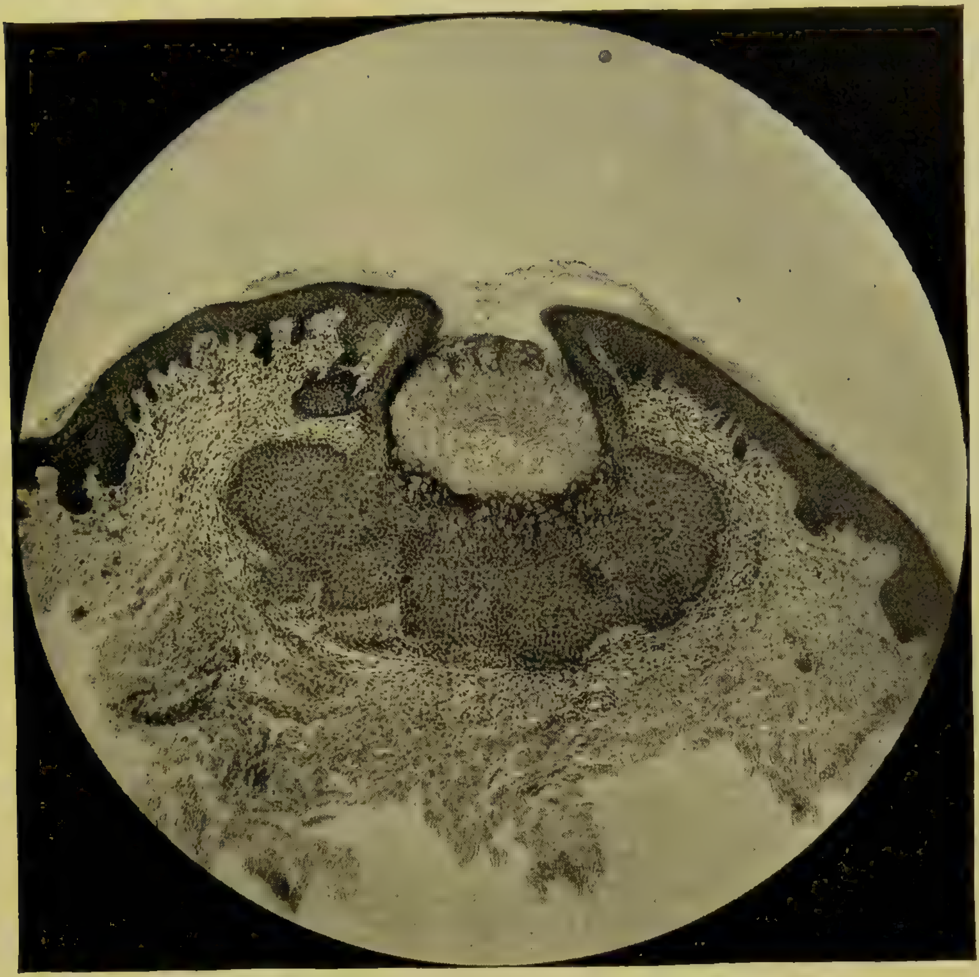

Fig. 64.—Molluscum contagiosum (after Fordyce).

Pathology and Morbid Anatomy.—According to recent investigations, molluscum contagiosum is to be regarded as a hyperplasia of the rete, the growth probably beginning in the hair-follicle; the so-called molluscum bodies, the peculiar rounded or ovoidal, sharply defined, fatty-looking bodies found in the microscopical examination of the growth, are to be viewed as a form of epithelial degeneration. It was formerly considered, and is still so held by several prominent observers, that the disease has its seat in the sebaceous gland, but the weight of opinion is now overwhelmingly against this view. Virchow's investigations first disclosed the epithelial character of the growth, and his conclusions have since been confirmed by the investigations of many others. The true or exciting cause of these growths remains, however, undiscovered; the disease is doubtless of parasitic origin, although there is as yet no conclusive proof of this. Several parasites have by as many different observers been found, one of the latest of which is the psorosperm, but each has not only lacked confirmation, but its pathological importance has been disputed, and its presence even when admitted by other investigators has been looked upon as accidental.

Etiology.—As yet the essential cause of molluscum contagiosum is, as already remarked, unknown. The disease is, I believe, contagious: the cases which have come under my observation have strongly supported this belief, in this respect being confirmatory of the observations of many other dermatologists. The main facts upon which such opinion is based are: single cases in an asylum or household are somewhat rare, whereas groups of cases either as several members of a family or a number of children in a "home" or an "asylum" are not uncommon; similar tumors have been produced by inoculation in a small proportion of the experiments so made; its communication from the face of a suckling child to the breast of its mother, and from patient to physician. It would seem scarcely necessary, indeed, to question the communicability of a disease bearing the name of *molluscum contagiosum*, but it is proper to state that there are many doubters, the Germans especially, and until recent years American observers also being reluctant to accept, or clearly in opposition to the contagious theory.

The disease is most frequently seen in children, being, comparatively speaking, uncommon in adults. Those of the poorer classes are usually its subjects, and particularly those who are ill fed, dirty, and who live in badly ventilated rooms or houses. Turkish baths, or the towels or gloves used, have, according to Hutchinson and Crocker, in some instances been apparently the means of communicating the disease.

Diagnosis.—There should be no difficulty, as a rule, in the diagnosis, as the size of the lesions, their waxy or glistening appearance, and the presence of the central orifice, are sufficiently characteristic. The disease is to be differentiated from fibroma, milium, warts, and acne.

Fibromata are rounded growths of small or large size, always exceeding that of the tumors of molluscum contagiosum, and are situated deeply in the skin, or even in the subcutaneous tissue; the lesions of molluscum contagiosum are superficial, seated in the upper skin and epidermal tissues, and are, comparatively speaking, small in size; the tumors of the former have no central orifice, depression, or opening, while these are usually quite distinct in the latter disease. The tumors of the former are commonly seated upon the trunk, or at least most numerously upon the trunk, whereas the growths of molluscum are most frequently upon the face, neck, and genitalia. The former disease is commonly seen in adults, the latter in children; the former is always met with as a single case, the latter not infrequently in groups of two, three, or more in the same family or among inmates of an asylum, "home," or school.

Milium tumors resemble the small molluscum growths, but lack the central orifice. Small warts also bear a rough likeness, but these latter are hard, fibrous growths, lacking the pinkish or pearl color and waxy or pearl appearance and central orifice of the molluscum tumors. It is scarcely possible to mistake the disease for acne—small, papular acne. Acne lesions are clearly connected with the sebaceous glands, have an entirely different appearance and course, are usually seen in various stages of papulation and pustulation, and, moreover, occur in adolescent and adult life.

Prognosis.—The prognosis of molluscum contagiosum is favorable, and it is only exceptionally that any permanent trace of the disease is left. In many instances the tumors will disappear spontaneously in the course of several weeks or a few months. In others, active measures are necessary to bring about a cure. All cases should, however, receive prompt treatment, in order that a possible source of contagion may be removed.

Treatment.—If there are but a few lesions, their contents may be immediately pressed out, and a deep application, through the central orifice, be made with a strong solution of silver nitrate or carbolic acid by means of a sharply pointed stick; or the lesions may first be incised and then the cauterization made. If the lesions are numerous, a stimulating ointment should be tried before operating upon individual growths; for this purpose an ointment, containing twenty to forty grains of white precipitate or sulphur to the ounce, should be rather vigorously rubbed into the affected parts once or twice daily. If this method should, after trial, prove without effect, the mild operative and cauterizing measures mentioned are to be resorted to. Lesions which have become pedunculated may be snipped off with scissors and the base touched with silver nitrate, or they may be ligated. Particular care should be exercised that the treatment itself does not produce scars, for it is to be borne in mind that if let alone these growths will sooner or later disappear, and almost invariably without trace.

PAGET'S DISEASE. (M. B. HARTZELL.)

Synonym: Malignant Papillary Dermatitis (Thin).

In a short paper published in the St. Bartholomew Hospital Reports for 1874, Paget first directed attention to a chronic inflammatory disease of the skin of the breast, which after a duration of one or more years was invariably followed by carcinoma. His description of the malady was based upon the observation of fifteen cases, all women between the ages of forty and sixty, in which the affection began with an eruption upon the nipple and areola, resembling in some cases an ordinary chronic eczema, with vesicles, scales, crusts, and abundant oozing of a yellow, viscid fluid; in others, the eruption bore some resemblance to psoriasis, being dry and scaly. In all these cases cancer of the mammary gland appeared within one or two years from the beginning of the cutaneous disease. Since Paget's first description of the malady, the observations of Butlin, Thin, Duhring and Wile, Crocker and Wickham, have added much to our knowledge of its clinical features, and more particularly its pathological histology.

Symptomatology.—In the great majority of cases the disease occurs upon the female breast, beginning upon the nipple, spreading thence to the areola, not infrequently extending beyond this region, and in a few cases covering the skin of the entire gland. As a rule, it is limited to one side, most frequently the right, and begins upon the summit of the nipple, with the formation of small corneous crusts, which are firmly adherent to the parts beneath. The removal of these crusts discloses at first a reddened surface, which, with the progress of the disease, becomes superficially ulcerated and fissured. By degrees the areola becomes involved; its surface, at first red and scaling, soon becomes excoriated, discharging a yellowish, transparent, sticky fluid; superficial ulceration occurs here and there, and more or less crusting follows. When fully developed, the diseased area is bright red and finely granular, oozing abundantly, circular or oval in shape, having the nipple for its center, and presenting a sharply circumscribed, in some cases slightly elevated border, in this respect differing markedly from the ill-defined outlines of a patch or ordinary chronic eczema of the breast. Scattered over this raw, oozing surface are to be seen small, smooth, pearly-looking islets of epidermis, round or irregular in shape, which may be regarded as evidences of an attempt at repair, or fragments of epidermis which have escaped destruction. These islets of epidermis may be regarded as somewhat characteristic of the malady. Early in the course of the affection parchment-like induration of the superficial tissues may be felt, and sensations of itching and burning, in varying degrees of intensity, are present from the beginning. Retraction of the nipple is a prominent and characteristic clinical feature in most cases; it begins early, and may lead to the complete disappearance of this structure. It is not invariably present, however, and the nipple may retain its usual prominence throughout the disease.

Within a period varying from a few months to many years cancerous degeneration makes its appearance, beginning superficially upon the ulcerating surface as nodules of proliferating epithelium, or, what is more common, in the deeper parts, and the malady enters upon its final stage, characterized by the symptoms met with in ordinary mammary carcinoma, deep-seated lancinating pain, extensive ulceration, and involvement of the axillary lymphatic glands. In a few instances the disease has been observed to begin elsewhere than upon the nipple as an erythematous patch, covered with fine scales, with sharp border, and accompanied by sensations of burning and itching, bearing the closest possible resemblance to eczema. Its subsequent course, however, is the same as in the ordinary cases.

While in the great majority of instances the female breast is the seat of the affection, one case at least has been reported by Forrest in which a chronic eczema of the breast in a male was followed by carcinoma. The patient was a man seventy-two years of age, and had had for some time a discharge from the nipple, which produced crusting, underneath which was a red and sensitive surface. In the course of six months the nipple retracted, and swelling of the lymphatics along the lower border of the pectoral muscle and in the axilla occurred. At the time of the observation all the signs of cancer were present.

The mammary gland is not the sole seat of the malady, since recent observations have shown that it may occur on other portions of the cutaneous surface. Crocker and Pick have each reported a case in which the scrotum and the penis were affected, the clinical features and the results of microscopical examination of the diseased tissues presenting the same characteristics seen in the mammary affection. In Crocker's case, which occurred in a man sixty years of age, there was a well-defined, superficially ulcerated, oozing patch on the left side and front of the scrotum, and on the adjoining under surface of the penis, resembling, on superficial examination, an eczema. Here and there, scattered over the ulcerated surface, were islets of pearly-white epithelium. In the course of six months small nodules made their appearance, which, upon microscopical examination, were found to be cancerous. The disease had first appeared a year previously as a raw surface at the root of the penis and adjacent scrotum. Paget, who saw the case, agreed in the opinion that the affection was similar to that found upon the breast.

Brocq has seen an epithelioma develop upon the back which resembled, in many of its features, Paget's disease; and Morris has reported the same disease as following eczema of the neck.

The period at which cancerous degeneration makes its appearance varies within wide limits, the average time being from six to seven years after the appearance of the skin affection. In all of the fifteen cases observed by Paget, cancer developed within two years at the latest; in most of them, however, at the end of a year. Jamieson has reported a case in which the malady had existed for twenty years before any evidence of cancer was present, and Duhring, one of ten years' duration. For some reason not yet determined, the disease shows a marked predilection for the right side, fully seventy-five per cent of all the cases in which the side affected has been noted being upon the right breast. With few exceptions it is unilateral. In most cases the malady occurs in those past the menopause, the decennium between fifty and sixty years being the period in which the greatest number of cases have been met with, although two cases occurring as early as twenty-eight years are reported. It is likely, however, that, owing to the slight annoyance which the affection causes in its earlier stages, it frequently exists long before it attracts much attention from the patient; and further observation will probably show that it is not so rare in early middle life as is to be inferred from present statistics. With the exception of the cases reported by Crocker, Forrest, and Pick, all have occurred in women, but it is not unlikely that a better knowledge of the malady will reveal a much larger proportion of cases in males. Bazin, and later Hardy, have both insisted upon the not infrequent etiological relationship between eczema and cancer; and the inference is fair that some, at least, of the cases in which carcinoma has followed eczema upon regions other than the breast in males were, in fact, examples of Paget's disease.

Pathological Anatomy.—The morbid anatomy has been investigated chiefly by Butlin, Thin, and Crocker in England, Duhring and Wile, and De Schweinitz in America, and quite recently by Darier and Wickham in France. The results of the investigations of these authors are much the same, agreeing in most important particulars, so that the pathological histology of the affection may be regarded as well determined. Sections taken from the advancing margin of the diseased patch show that the pathological changes end abruptly at a point corresponding to the sharply limited, in some cases slightly elevated, border which is one of the striking features of the disease. At this point there is a marked increase in thickness of all the layers of the rete, the cells being in a state of active proliferation, many containing two, three, and even more nuclei, others undergoing division. Between the epithelial cells are to be seen numerous migratory cells elongated or branching, their shape corresponding to the intercellular spaces. The interpapillary prolongations are markedly increased in size, extending much deeper than normal into the corium, while the corneous layer is exfoliating. The corium shows the changes characteristic of inflammation, the papillæ being increased both in length and breadth, and more or less densely infiltrated with small round cells. In the upper layers of the corium the capillaries are dilated and surrounded by a sheath of lymphoid cells. The glandular appendages are likewise involved in the inflammatory exchanges, the ducts being dilated and surrounded by inflammatory exudate, their epithelial lining being in the stage of active proliferation. In the older portions of the malady, which are to be found nearer the center of the lesion, the epidermis is more or less completely disorganized; the corneous and granular layers have disappeared, the rete being much thinner than near the margins, even in places having completely disappeared (*vide* Fig. 65). In other parts interpapillary prolongations of epithelium are present, extending deeply into the corium, in some instances giving rise to alveoli filled with epithelial cells. In this manner cancerous degeneration may have its origin in the epidermis. The papillary

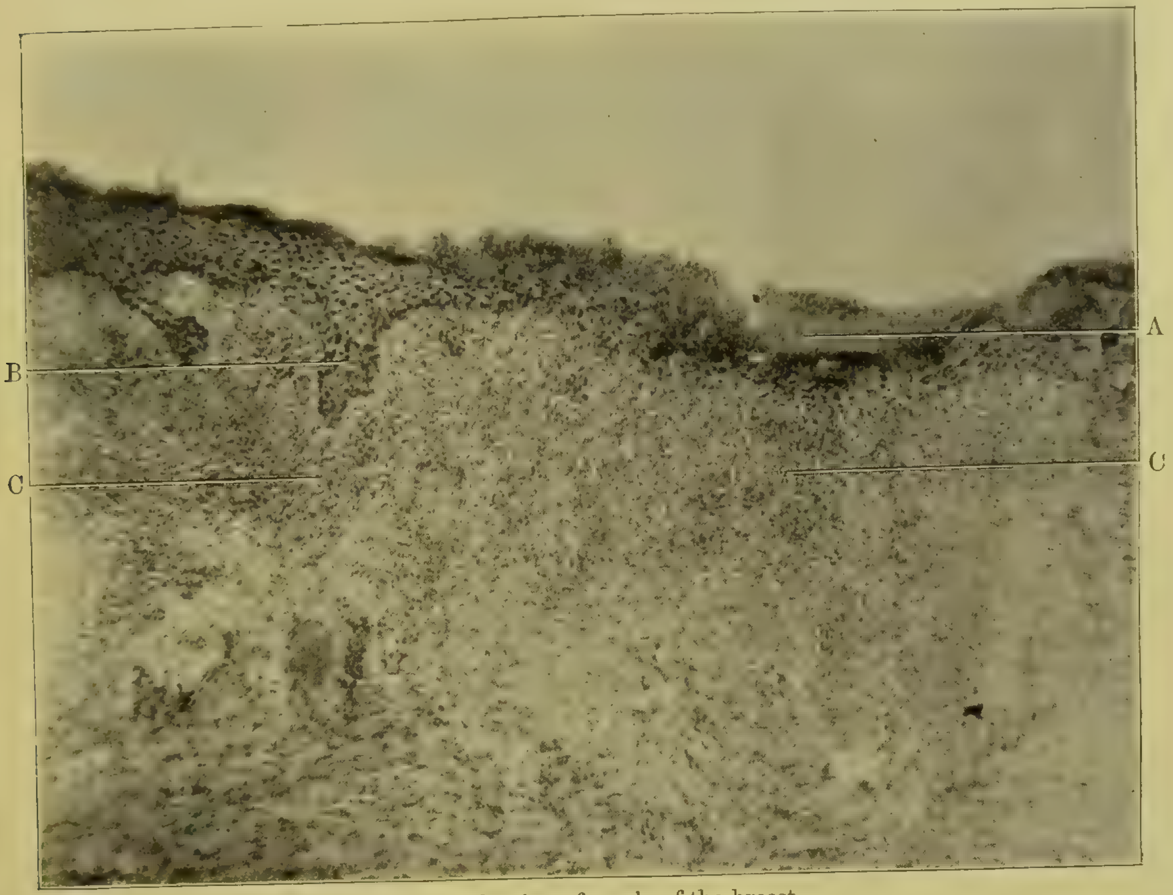

FIG. 65.—Section of areola of the breast.

A, ulcerating surface—the rete mucosum has been reduced to a mere remnant; B, down-growing proliferating epithelium; C, C, dense round-celled infiltration in the corium. (From photomicrograph by the author.)

layer of the corium is replaced by a dense infiltration of round cells, and in the deeper layers are alveoli filled with proliferating epithelium, evidences of cancerous degeneration. Upon the nipple the epidermis varies much in thickness, in places being entirely destroyed by ulceration. The milk ducts are filled with epithelial cells, and in their deeper portions the epithelial proliferation is in places so abundant as to cause rupture of their walls and subsequent invasion of the surrounding tissues by the epithelial growth. Owing to the atrophying process which has taken place in the inflammatory products surrounding the milk ducts, bands of dense fibrous tissue are seen beneath the nipple, the contraction of which has produced retraction of this structure. Special mention must be made of the recent investigations of Darier concerning certain peculiar cell forms which exist more or less abundantly in the midst of the epithelium, not only of the epidermis, but of the lactiferous ducts, the glands, and of the cancerous alveoli. These cells are two or three times the size of the surrounding epithelium; are round or oval, with a distinct limiting cell wall which presents a double contour. Immediately within the cell wall is a clear space produced by the contraction of the intracellular protoplasm, probably the result in part of the action of the alcohol or other hardening fluid used in the preparation of the sections. In the center of the cell is a considerable mass of protoplasm surrounding one or more large nuclei. Occasionally this protoplasmic mass remains in contact with one side of the cell, owing to its irregular retraction under the influence of the hardening liquid. In many of these cells, besides the mass of protoplasm and the well-defined nuclei, is to be found, usually flattened against the inner surface of the cell wall, a granular mass which Darier regards as the remains of the nucleus of the original cell, crowded to one side by the growth of the protoplasm of the invading cell (see Fig. 66). These bodies have been found in all cases of the disease in which they have been sought for, not only in those occurring upon the breast, but in the cases reported by

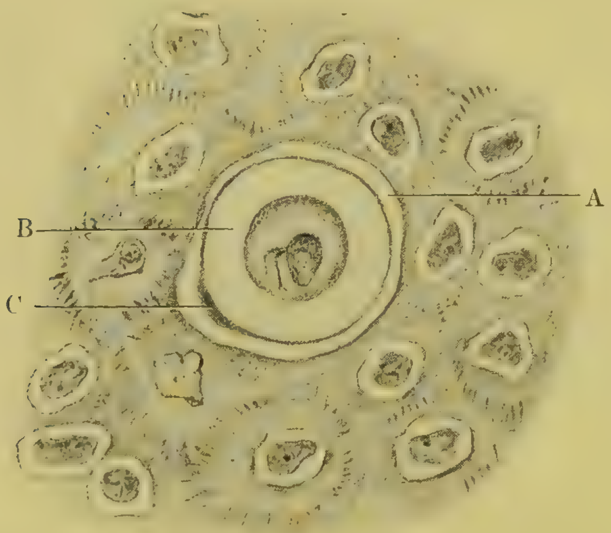

Fig. 66.—A, cell containing B, a so-called psorosperm; C, nucleus of invaded cell crowded to one side by the parasite (Darier).

Crocker and Pick in which the malady was situated upon the scrotum and penis.

Various views are held as to the pathology of the disease. Thin, who has carefully studied the malady microscopically, believes that it is due to "a slowly advancing cancerous change near the mouths of the lactiferous ducts, which at a very early stage leads to irritative effects in the superficial tissues of the nipple and surrounding skin, and eventually penetrates into the substance of the mammary gland." McCall Anderson is of the opinion that it is, from the first, of a malignant nature. On the other hand, Kaposi finds nothing special in the disease, regarding it as simply a chronic eczema, accidentally complicated by carcinoma of the gland. The most recent theory is that propounded by Darier, viz., that the affection is a cutaneous psorospermosis, the peculiar round bodies described above being psorosperms or coccidia, organisms belonging to the class of sporozoa. These, gaining access to the epidermis through the abrasions which occur so commonly upon the nipple, less frequently on other portions of the cutaneous surface, cause proliferation of the epithelium of the epidermis and glandular structures, and inflammatory changes in the corium. Other French observers, as Brocq and Wickham, accept this theory, but it can not be regarded as fully proved. The so-called psorosperms are believed by many competent observers to be simply forms of cell inclusion (degeneration), and not organisms which have had their origin external to the skin. The question as to their true nature and the relation which they bear to the malady under consideration must be determined more fully by future research; the data at hand are insufficient for positive conclusions.

Etiology.—Among the causes which predispose to the disease, age and sex play important *rôles.* Out of twenty-three cases collected by Wickham, eleven, or almost fifty per cent, occurred between the ages of fifty and sixty. In view of the cancerous nature of the malady in its final stages, this is only what was to have been expected. As to sex, all the cases thus far reported have been females, with the exception of three, or possibly four. Repeated or long-continued irritation doubtless plays an important part in the production of the disease. The fissures and superficial abrasions which arise upon the nipple during lactation are frequently its starting point, and not uncommonly, as has already been mentioned, the affection remains limited to the nipple and areola. Darier, to whose views we have already referred, regards psorospermia as the active agents concerned in the production of the disease.

Diagnosis.—An early diagnosis is of the very first importance, in order that appropriate treatment may at once be instituted. In its early stages the distinction between it and chronic eczema of the breast, the disease with which it is most likely to be confounded, may be exceedingly difficult, even at times almost impossible; but attention to the following points, together with careful observation of the course of the affection for a time will usually suffice to make the diagnosis clear: Paget's disease occurs most frequently in those past the menopause, between forty and sixty years of age. Eczema is seen oftenest during the child-bearing period, and is especially apt to occur during lactation. In Paget's disease the affected surface is bright red and granular, in places superficially ulcerated, the border of the patch is separated by a sharp line of demarcation from the adjoining healthy skin, and at times this border is slightly elevated; more or less induration of the patch can be felt early in the disease. In eczema, on the other hand, the bright red granular surface and the induration are absent, while the inflamed area fades gradually into the surrounding skin. Finally, the microscopic examination of the scales removed by lightly scraping the raw surface will enable us to determine the presence or absence of the so-called psorospermia. Although the exact significance of these bodies may yet be in doubt, their presence would establish the diagnosis of Paget's disease, since they are always to be found in this malady, but never in eczema. The procedure which succeeds best in this microscopical examination is the following: Some of the scales are removed with forceps, or, better, by lightly scraping the diseased surface with a dull curette, and placed in a two-per-cent solution of ammonium bichromate for several days, after which they should be washed and stained with hæmatoxylon and mounted in balsam or glycerin; if "psorospermia" are present they are readily recognized.

Prognosis and Treatment.—In the early stages of the malady the prognosis is fairly good, properly directed, energetic treatment being followed by its arrest. If, however, the disease comes under observation late, the prognosis is unfavorable, being the same as in carcinoma. In the earliest stages, when the diagnosis is yet doubtful, the treatment is much the same as in eczema, special care being taken to avoid all irritating applications. When this fails to produce improvement, and the diagnosis of Paget's disease is fairly established, energetic treatment should be instituted at once. The diseased tissues should be thoroughly removed by the curette, or destroyed by caustic applications, or, what is perhaps preferable, both these procedures should be employed, the use of the curette being followed by caustics.

Among caustics we may employ chloride of zinc, in a solution 1 : 3, applied for from four to six hours, following it with a dressing of iodoform gauze, and later applying mercurial plaster. Darier, who recommends this method of treatment, has reported a case treated in this manner which showed most gratifying results; the greater portion of the inflamed surface was covered with firm epidermis, exfoliation was no longer present, and the new epidermis was absolutely normal in appearance. Owing, however, to neglect of treatment, a relapse occurred As recommended by Crocker, a paste of chloride of zinc may be applied for several hours, followed by poultices or lint wet with a saturated solution of boric acid, until the slough separates. This paste is made as follows: ℞ Zinci chloridi, ʒ iv; liq. opii sedativ., ʒ iv; amyli, ʒ jss.; aquæ, ℥ j. Ft. pasta. A thirty to forty per cent ointment of pyrogallol may be used with good effect, applied for three or four days until a sufficiently deep destruction of the tissues has taken place. This should likewise be followed by poultices until the slough has come away, leaving a clean, granulating surface, which may then be dressed with iodoform or mercurial plaster. The pyrogallol has the advantage of being almost or quite painless. Recently, Elliot has reported a case in which the use of fuchsin in an ointment containing from one to five grains seemed not only to arrest the progress of the disease, but to cause cicatrization of the ulcerating surface; it likewise afforded marked relief from pain and burning.

When, however, cancerous degeneration has already taken place, as manifested by the appearance of firm nodules in the deeper tissues, amputation of the breast should be performed at once, since nothing less than total extirpation of the diseased tissues offers any hope of cure.

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EPITHELIOMA. (J. A. FORDYCE.)

Synonyms: Epithelial Cancer; Cancroid; Epithelial Carcinoma; Hautkrebs; Plattenzellenkrebs; Cancroïde; Epithéliome cutané.

Definition.—The term *carcinoma* is generally employed to designate malignant new growths of epithelial origin, including those which originate from glandular epithelium, as well as those starting from the epidermis or its appendages, although the name *epithelioma* is used by most writers in speaking of cancers of the skin or adjacent mucous membranes.

An overgrowth of epidermis is met with in a number of benign affections of the skin, as warts, corns, molluscum contagiosum, and in lupus, syphilis, and other chronic inflammatory affections. In these cases, however, the growth of epidermis is either outward, or, if there is an inward growth of the interpapillary processes, it is to no great depth, and the normal boundary between the epidermis and the derma is preserved.

Of late there has been a tendency to enlarge the meaning of epithelioma, so that it may include both the benign and malignant overgrowth of epithelium. General custom has, however, restricted the meaning of the term, so that, as used by the majority of writers, it signifies an atypical or malignant new growth of epithelium, which undergoes ulceration, tends to recur after removal, to infect the connective tissues and adjacent parts of the skin, and to reproduce tumors in the communicating lymph glands and distant organs, which preserve many of the characteristics of the parent epithelium.

Symptomatology.—From a clinical standpoint, three varieties of skin cancer are usually described: (1) the superficial, flat, or discoid; (2) the deep-seated, or nodular; (3) the papillary.

Superficial Discoid Epithelioma.—This variety of the affection, when seen sufficiently early in its development, presents several distinct clinical appearances, which may depend on the anatomical character of the tissues first attacked. It is scarcely possible, with our present knowledge, to connect each one with a definite origin. As far as my own observation goes, the superficial variety is most frequently situated on the face, and begins as a minute, elevated, pearly-colored papule, about the size of a pin's head, gradually enlarging to the size of a split pea, or larger, before ulceration of its surface takes place. These small, waxy-looking papules sometimes occur singly, sometimes in groups, irregularly rounded, oval, or arranged in a linear manner. On the faces of many adults over the age of forty or fifty years one or more of these small pearly tumors may be noted, which have remained for years without change of any kind. Even when grouped they may preserve their benign character. Spontaneously, or as a result of scratching, their surface becomes fissured or excoriated, and covered with crusts made up of the secretion and blood from the affected surface. In the course of years the new growth undergoes ulceration in the center, new papules appear at the periphery, which give it an elevated appearance, and have the

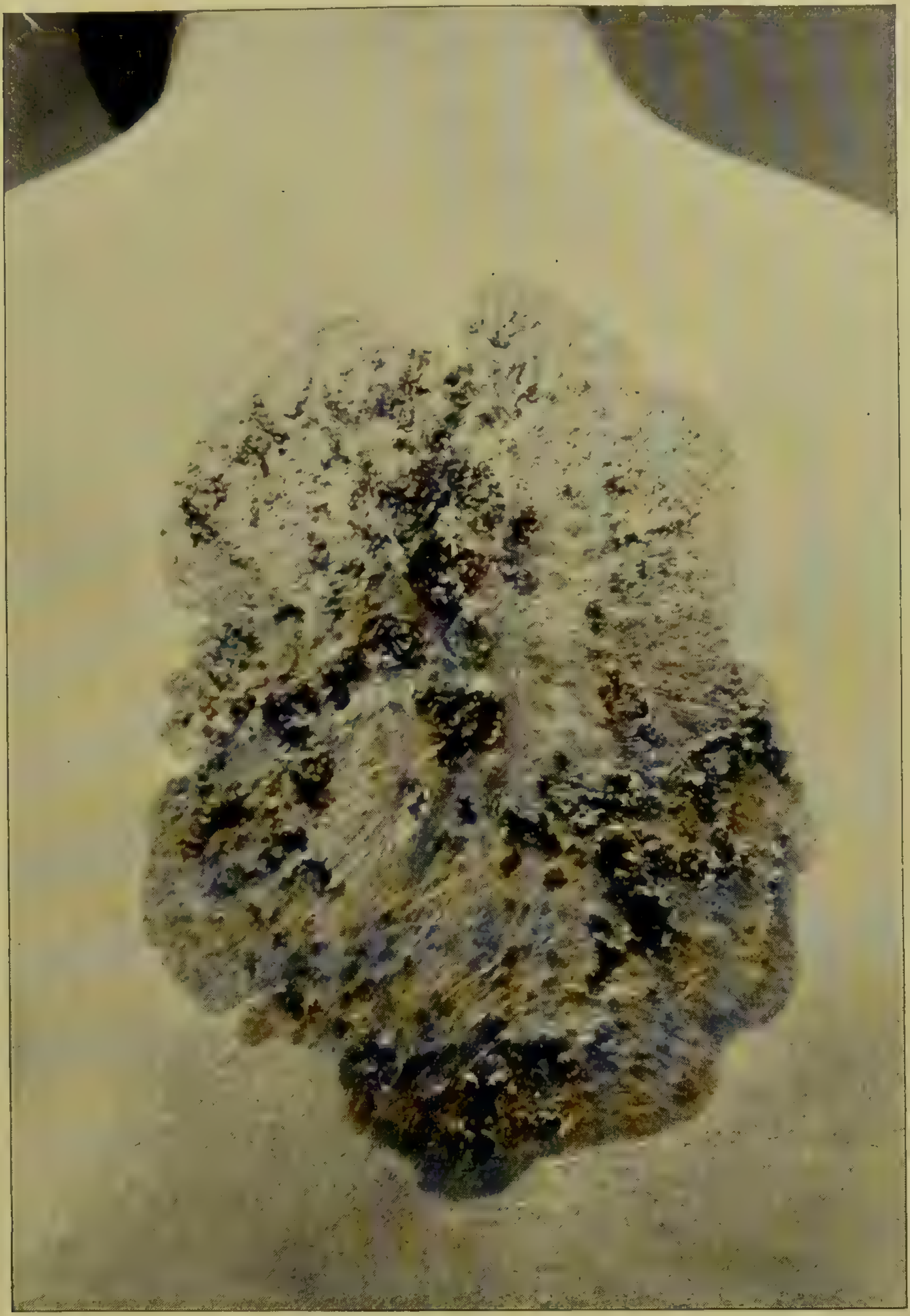

FIG. 67.—Superficial discoid epithelioma. A similar patch was present on the anterior surface of the chest. (Photograph by Dr. Piffard.)

same aspect as the original waxy epithelial deposit. These miliumlike bodies may readily be expressed by a blunt instrument or a curette, and are found by microscopic examination to be composed of epithelial cells. They are characteristic of many forms of cancer of the skin, and have been variously named cancroid bodies, epidermic globes, etc.

The ulceration resulting from this variety of epithelioma assumes various aspects. Sometimes it is so superficial as to involve only the papillary layer of the derma, healing at the center while it spreads at the periphery, or healing at one side and spreading in segments of circles, thus producing circinate (see Fig. 67) and gyrate forms, as in lupous or syphilitic ulceration, and involving in its destructive course large portions of skin. Sometimes the greater part of the face or scalp may be implicated, and death result from exhaustion, without any involvement of the lymphatic glands or the production of metastatic growths in distant organs.

Multiple patches of this superficial serpiginous ulceration are sometimes encountered, separated by large portions of sound tissues. It may, as a rule, be differentiated from serpiginous, syphilitic, or lupous ulceration by the presence of the waxy-looking papules, previously referred to, at the border of the patch. In exceptional instances the appearance of new papules at the periphery may cease, and the affection spontaneously heal with the production of a superficial scar. Instead of assuming the form described, the ulcer is irregularly circular, spreading both at the periphery and deeply, with elevated, rounded, sharply defined edges, sometimes undermined (Fig. 2, Plate XXI). The center of the ulcer is in old cases much depressed below the surface, in some parts more than others, frequently covered with red, knobby granulations, which readily bleed on irritation. If secretion from the ulcer is abundant, it dries in the form of dark-brown crusts, which on removal reveal the characteristic appearance of the sore. On scraping the ulcer with a curette, the edges and floor are found to be made up of soft, friable tissue, extending beneath the overlying epidermis and easily removed. When the affection is old, and involves large territories of skin, the ulceration is irregular in aspect, presenting red, succulent elevations, readily bleeding on irritation, papillary outgrowths on the floor or at the edges, cicatricial tissue distributed here and there, deep and superficial ulceration, and waxy nodules at the margins, over which dilated blood-vessels may be seen.

Hutchinson (Path. Soc. Trans., 1889) has described, under the name *crateriform ulcer*, a variety of epithelial cancer, which affects the upper portions of the face and pursues a rapid course. The ulceration takes place at the summit of a rounded nodule, forming a crateriform cavity with thick walls. Histological examination has shown such ulcers to be typical squamous-celled epitheliomata, and not showing the structure which is supposed to be characteristic of rodent ulcer.

PLATE XXI.

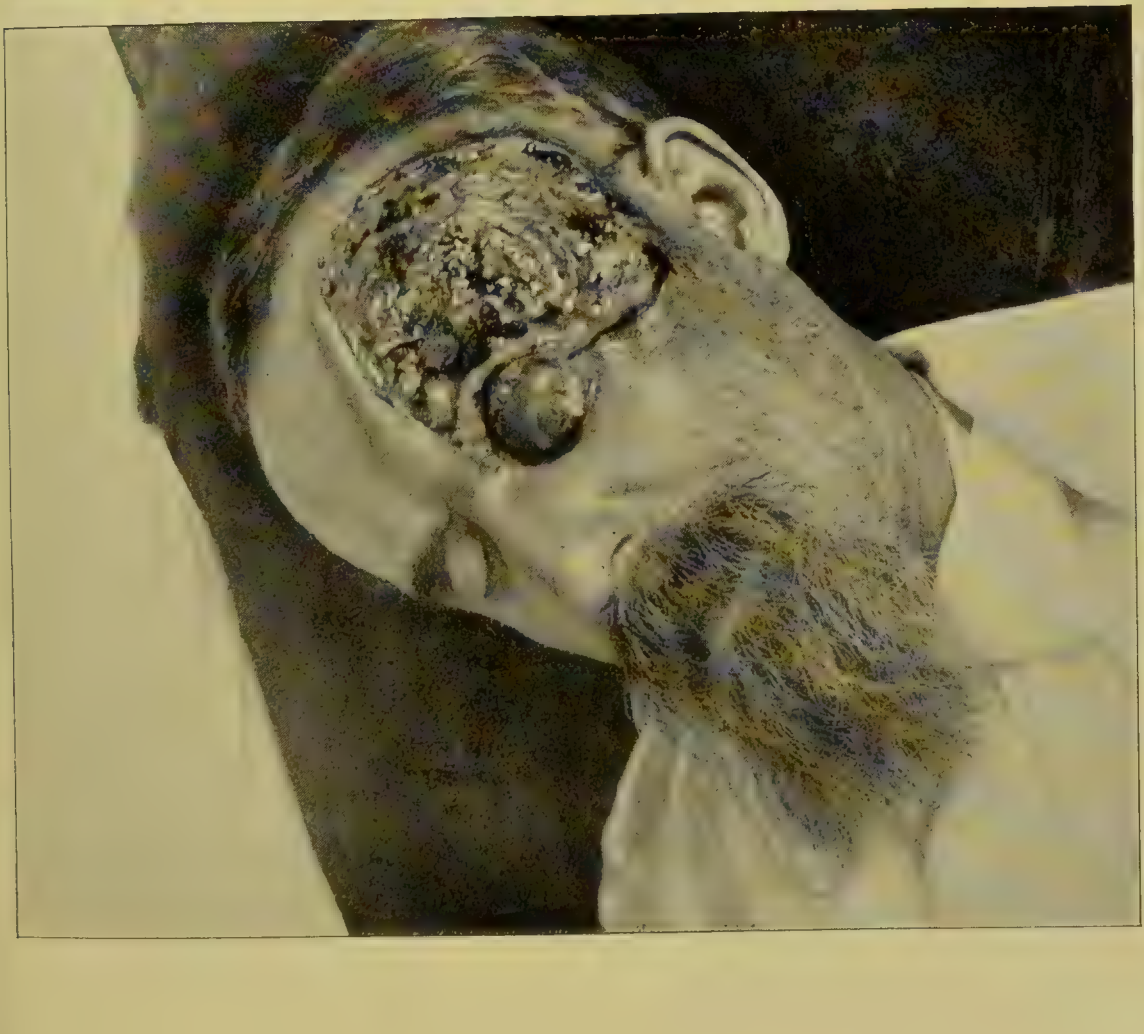

FIG. 1.—ULCUS RODENS OF SEVERAL YEARS' DURATION (Morrow).

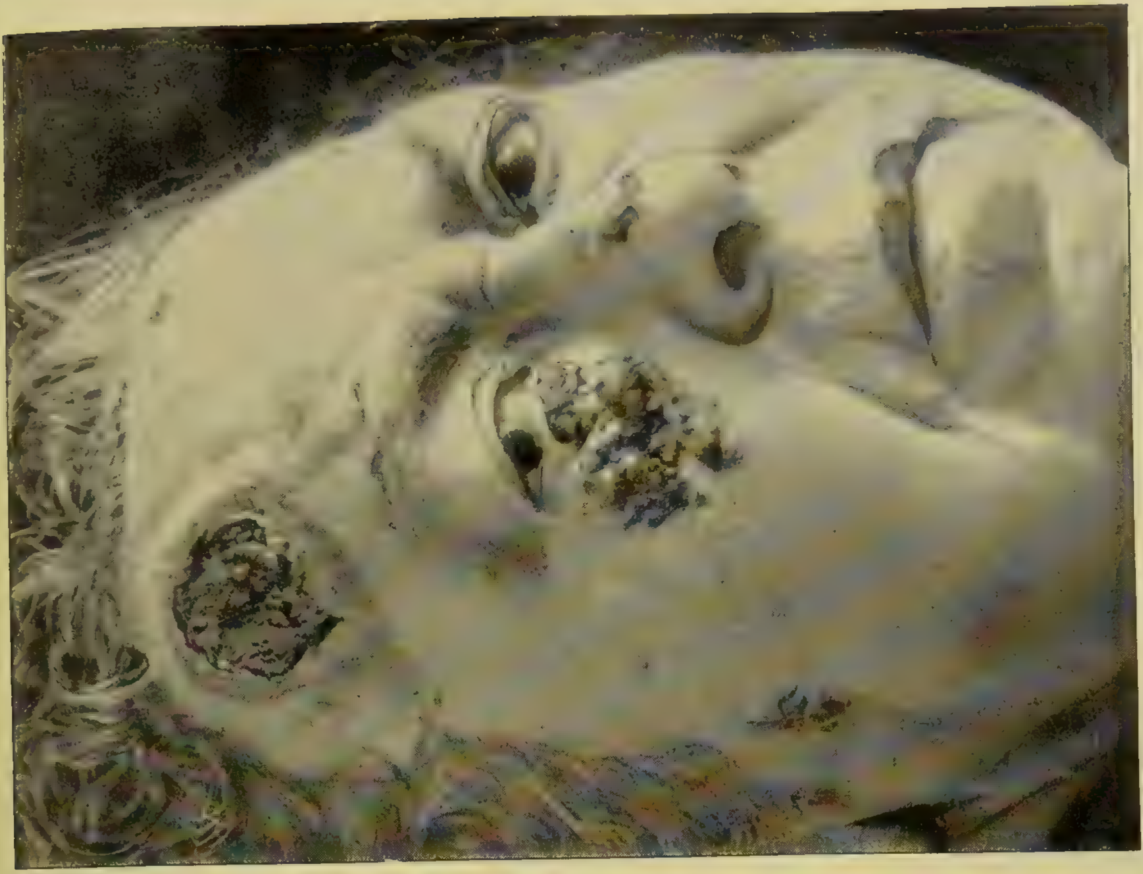

FIG. 2.—MULTIPLE SUPERFICIAL EPITHELIOMATA OF THE FACE, ORIGINATING FROM SENILE WARTS (Morrow).

The variety of epithelioma just described appears most frequently on the upper two thirds of the face, but may be found on the neck, scalp, or trunk, or on almost any portion of the cutaneous surface. It may originate from the healthy epidermis or develop at the site of a senile wart or other papillary growth, a fissure which becomes indurated, a scaling papule, a superficial excoriation; from syphilitic, lupous, or chronic ulceration; from cicatrices, or from the base of a cutaneous horn. The dermatitis which is produced by the irritating effects of paraffin, coal-tar, or soot is sometimes followed by multiple patches of superficial epithelioma. The superficial skin cancer may remain from the beginning to the end of its course, covering a period of twenty years or more, confined to the superficial and deep layers of the derma, showing no tendency to extend more deeply or to involve the communicating lymph glands. It may, however, involve in a destructive ulceration the underlying tissues, and yet produce no general infection.

Deep-seated or Nodular Epithelioma.—This variety may develop from the extension of the superficial form or occur primarily. Epitheliomata of mucous membranes are usually of this kind, though they may exceptionally be met with in the skin. While the subcutaneous and deeper skin layers are often affected secondarily as a result of the extension of the disease from the surface, the new growth may first appear as a circumscribed nodule beneath the skin or mucous membrane, either primarily or as a recurrence of the disease near cicatrices of former operations for malignant disease. It may first be noticed as a small, movable papule, the size of a pea or smaller, which gradually enlarges to a tumor the size of a hickory nut or larger, hard, firm, or elastic to the touch, irregularly rounded or flattened in outline, and sending out indurated prolongations laterally or into the subcutaneous tissue. The skin overlying the tumor is irregularly elevated, pale or pinkish in color, and covered with dilated capillaries. Adhesions may form between the tumor and overlying skin, causing retraction of the surface, and at the same time all the surrounding tissues are involved in the growing mass, which is no longer movable.

After a variable duration, ulceration may take place, either on the surface, presenting many of the characteristics of the ulcer previously described, or as a more rapid destruction of the deeper parts of the growth, causing the surface to soften and break down with the production of a deep, undermined ulcer, with an irregular vegetating base and hard elastic edges containing the waxy nodules before mentioned.

The course of the disease is much more rapid than in the superficial variety, and within a few months to two or three years the lymph glands are involved, metastatic tumors have formed in internal organs, marasmus sets in, and death occurs.

Under the name of *galloping* or *phagedenic epithelioma*, Besnier, in his notes to the French translation of Kaposi's Pathologie und Therapie der Hautkrankheiten, calls attention to a form of the disease which pursues an extremely rapid course. He recalls a case presented by Vidal at the French Dermatological Society, in which the new growth in less than six months had involved the upper lip, the right cheek, and base of the nose. The mucous membranes of the lip and cheek presented papillary vegetations, and a part of the superior maxillary bone was destroyed. A small, pearly, epithelial deposit, scarcely to be seen, attained the dimensions of a small nut within a week.

Papillary Epithelioma.—While papillary outgrowths are very common in connection with the different varieties of skin cancer springing up from the base and periphery of the cancerous ulcer, especially when mucous membranes are attacked, a primary papillary variety sometimes occurs, which is generally superficial in its situation and most commonly met with at the union of the skin and mucous membranes, on mucous membranes themselves, the extremities (see Fig. 68), or on the scrotum. In cancer of the lower lip a superficial, elevated swelling is seen, with a coarsely granulated surface, looking not unlike a syphilitic condyloma, and having for an anatomical basis enlarged and closely approximated papillæ. It may spread laterally and occupy almost the entire border of the lip before involving the deeper parts or undergoing ulceration. When on the extremities, prepuce, or scrotum, a large surface may be covered with a papillary outgrowth, rendered more distinct when the surface epithelium is eroded and disappears. The growth may be attached by a broad base, or be somewhat pedunculated, and assumes cylindriform, spheroidal, or cauliflowerlike projections above the cutaneous surface. These growths are

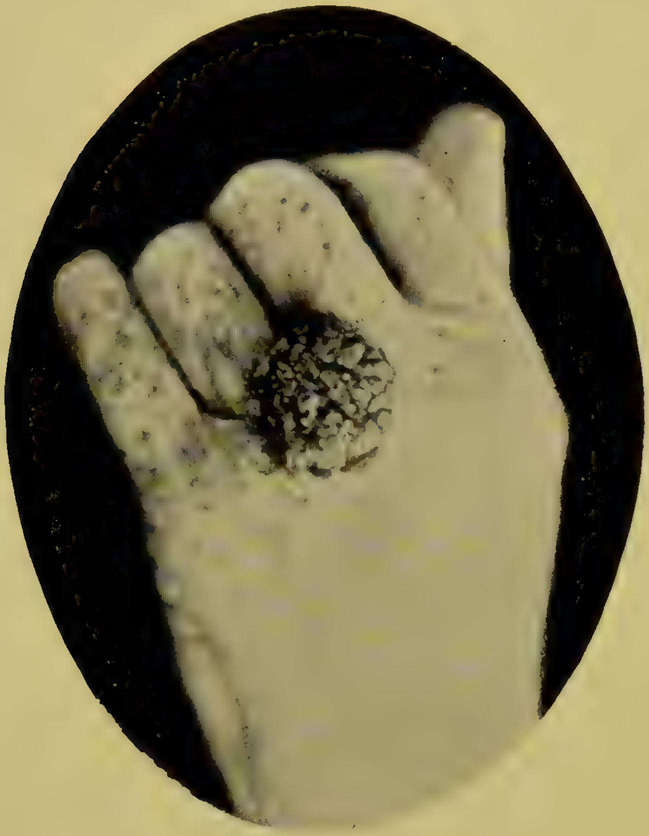

Fig. 68.—Papillary epithelioma (Morrow).

very vascular, and readily bleed spontaneously or on irritation. Sooner or later ulceration occurs, the deeper portions of the skin become involved, with extension to the lymph glands, and ultimately death results as in the primary deep-seated cancers. Occasionally such growths pursue a very malignant course. Their average duration, however, is stated to be about four years.

The subjective symptoms connected with cancer of the skin are variable. Frequently no pain or inconvenience is experienced until ulceration occurs. Sometimes lancinating pains are experienced, or sensations of a burning or stinging character. When ulceration has taken place, the pain and inconvenience are proportional to the irritation to which the disease is subjected. The movements of the lips or tongue may cause painful fissures over tumors in these parts, or the passage of irritating discharges over an epithelioma about the anus may give rise to acute pain. Itching is sometimes a distressing symptom in the superficial variety of the disease.

Chimney-Sweep's Cancer of the Scrotum.—This peculiar variety of cancer, first described by Percival Pott, in 1775, seems to occur almost exclusively in England. It is due to the chronic irritation produced by the retention of soot in the folds of the scrotum. According to the investigations of Butlin (Brit. Med. Jour., vols. i and ii, 1892), Continental sweeps are almost exempt from the disease by reason of their greater cleanliness and the protection afforded by their manner of dress. The development of cancer of the scrotum in chimney-sweeps is preceded by the occurrence of chronic dermatitis, and of warty outgrowths which may retain their benign character, or one or more of these warts may enlarge and extend deeply into the tissues. Ulceration then takes place, which destroys both by surface extension and by involving the underlying tissues. In former days, before the time of early operations, all the tissues from the pubes to the anus were sometimes destroyed by the ulceration. Secondary involvement of the glands in the groin, though often long delayed, is frequently observed.

Tar and Paraffin Cancer.—Richard Volkmann (Beiträge zur Chirurgie, 1875, p. 380) deserves the credit for first calling attention to cancer of the scrotum and forearms occurring in workers in coal-tar and paraffin, although in the following year Dr. Joseph Bell, of Edinburgh (Edinburgh Med. Jour., 1876, p. 135), made a similar and independent observation. The changes in the skin, which precede the development of paraffin cancer, resemble very closely those met with in chimney-sweep's cancer. The skin becomes dry, parchmentlike, and in places thickened; the openings of the sebaceous glands are occluded by the tar, producing acnelike lesions. Warty outgrowths occur, which may become the seat of a malignant ulceration.

Esmarch and Langenbeck (quoted by Butlin, *loc. cit.*) have suggested that the irritation of tobacco smoke and juice probably has a similar influence in causing the development of cancer of the mouth to that of soot, tar, and paraffin in causing cancer of the scrotum.

Tillmanns, of Leipsic (Deutsche Zeitschrift für Chirurgie, xiii, 519, 1880), has discussed at length the relationship of these substances to the development of cancer, and concludes that the same etiological factor is present in all. With our present knowledge of the etiology of the disease, we would scarcely be justified in ascribing any specific influence to these substances other than the local irritation which they produce.

Cancers from Nævi.—The majority of malignant tumors having their origin in pigmented moles are probably sarcomata. Well-authenticated examples of pigmented carcinomata having such an origin have been reported by Kolaczek (Deutsche Zeitschrift für Chirurgie, xii, 1881), Nunn (ref. Birsch Hirschfeld), and others. Lately, Unna has revived the subject in an excellent article entitled Naevi und Naevocarcinome (Berliner klinische Wochenschrift, No. 1, 1893). He had the opportunity to examine specimens from a case reported as pigmented sarcoma originating in such a nævus, together with the metastatic tumors which had developed in the skin, muscles, and brain. His examination revealed, in an unexpected manner, a carcinoma of alveolar structure. After a long study of the soft, button-shaped moles he is convinced that they are made up of cells which have separated from the epithelial covering during fœtal life, or shortly after birth, forming so-called "rests," which later in life, by a traumatism or infection, may be stimulated into activity and result in the development of the tumors in question. While never a believer in the Cohnheim theory of the origin of malignant tumors, he nevertheless believes that the investigations mentioned speak strongly in favor of the embryonic origin of a certain class of such growths.

Epithelioma of the lip, in the vast majority of cases, occurs on the lower lip, usually on one side of the median line at the junction of the skin and mucous membrane. In one or two instances a tumor of the upper lip, where it was brought in contact with the primary cancer, has been noted, suggesting an auto-inoculation.

It may begin as a small pimple, attracting little notice until some induration or involvement of the surrounding tissues occurs, or the patient's attention may first be directed to a slight excoriation, fissure, or superficial ulcer, which may be the surface indication of a deeper lesion.

A tumor of considerable size may occur involving the entire thickness of the lip before ulceration takes place. In other cases ulceration is the most marked feature, while; again, tumor formation and ulceration may go on at the same time.

As a rule, the center of the infiltration softens and becomes covered by a scab; as the cavity deepens its margins become elevated and overhanging, while the base is irregularly nodular (see Fig. 69). The submaxillary and lingual glands become involved, adhesions form between the growing mass and the underlying bone, the teeth may be loosened, and all the neighboring structures destroyed. In its rapid and deep growth it presents a marked contrast to the superficial variety of epithelioma met with on the face.

The development of epithelioma on patches of *leucokeratosis of the tongue* has been observed with sufficient frequency to excite the suspicion that some more intimate connection exists between the two affections than a mere association. Leucokeratosis of the buccal mucous membrane of idiopathic origin, as a sequence to syphilitic lesions or from the combined influences of the latter and tobacco smoke, has, indeed, been regarded as the first stage of the malignant process. Our knowledge of the nature of the cancerous disease is yet too vague to permit the expression of a positive opinion on this point. Besnier has noted the occurrence of epithelioma of the vulva on a patch of leucokeratosis of this region, and Schuchardt (Volkmann, Sammlung klin. Vorträge, No. 257, p. 2210) has reported a similar observation for the mucous surface of the prepuce.

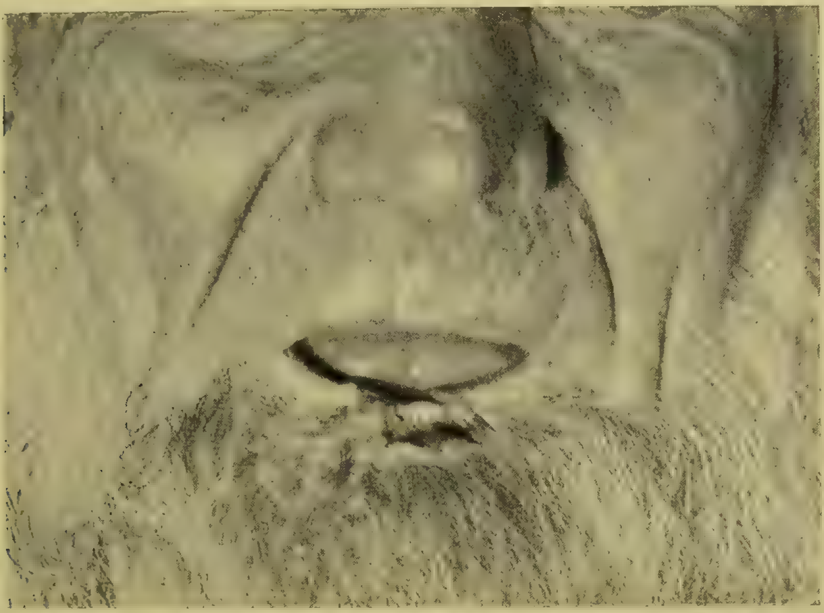

FIG. 69.—Early stage of epithelioma of the lip (Piffard).

Cancer of the tongue or mucous membrane of the mouth may begin as a superficial abrasion caused by a ragged tooth, soon becoming an ulcer with an irregular granulating base, as a small tubercle, a painful fissure, or a deep-seated nodule beneath a patch of leucokeratosis, or a warty growth on its surface. Some of these conditions may in the beginning not be cancerous, but only become so by subsequent inoculation or degeneration.

An ulcer or excoriation caused by the irritation from a tooth may pass away when its cause is removed; warty growths on the tongue from the same cause may also disappear with the offending cause. Butlin (Diseases of the Tongue) quotes a number of instances of this kind. In whatever way the growth begins, induration is soon felt, both at its periphery and base, and from now on its progress is quite rapid. The glands beneath the jaw may enlarge, while speaking and swallowing are painful by reason of the motion to which the enlarged organ is subjected. The surface covering the indurated area becomes ulcerated, fissured, and covered with sensitive granulation or warty growths. The tongue may become so large that it can not be protruded between the lips, while the constant flow of saliva and disagreeable odor from the discharging surface render the patient an object of the greatest sympathy. The communicating lymph glands are soon involved, and metastasis to internal organs not long delayed. On the mucous membrane of the cheek epitheliomata are less frequent. They sometimes manifest themselves as a fungous outgrowth, and are not infrequent as an extension of cancer of the lip. They may occur as the result of auto-inoculation where the diseased tongue is brought in contact with the mucous membrane.

I have observed in two instances a peculiar variety of epithelioma of the skin which is not included in the varieties mentioned in the foregoing description. In one case an extensive ulcer, covering two thirds of the forearm, resulting from a burn, refused to heal after the application of the ordinary methods of treatment; its edges became elevated and hard, while the granulations over its surface were larger and harder than healthy granulations, and assumed a wartylike character. A microscopic examination revealed a typical squamous-celled epithelioma.

In another case, an ordinary ulcer of the leg presented a similar appearance, which was shown by the microscope to be due to atypical epithelial proliferation, with the production of epithelial "pearls."

Localization.—The cancers which come under the care of the dermatologist are more usually situated about the face, near the eyelids, the wing of the nose, on the cheeks, forehead, etc. The lower lip is said by Paget to be involved in about fifty per cent of all cases of epitheliomata, the tongue and external genitals of both sexes following next in order of frequency. In one hundred and two cases collected by Thiersch, seventy-eight occurred on the face, and, out of these, forty-eight were on the lower lip. Epithelioma of the upper lip occurs, but is rare. Rudolph Volkmann has collected statistics of one hundred and twenty-eight cases of cancer of the extremities which developed from scars, ulcers, etc. Of these, ninety-five occurred on the lower extremities, and thirty-two on the upper.

RODENT ULCER.

Synonyms: Jacob's Ulcer; Ulcus Exedens; Lupus Exedens; Noli me Tangere; Ulcère Cancreux; Der Flachekrebs, etc.

English writers first described a variety of superficial epithelioma of the face, to which they assigned peculiar clinical as well as histological features. It was looked upon by the older writers, including Brodie and Paget, as a disease distinct from cancer. Paget states (Lectures on Surgical Pathology, p. 726), that he has frequently examined portions removed from such ulcers without discovering anything to suggest their cancerous nature. In the older text-books this affection was called lupus exedens, being regarded as a variety of lupus rather than cancer.

Symptomatology.—Paget (*loc. cit.*) quotes the following description, from Brodie's Lectures on Pathology and Surgery, as to the manner in which rodent ulcer begins: "A man has a soft tubercle upon the face, covered by a smooth skin. He may call it a wart, but it is quite a different thing. On cutting into it you find it consists of a brown, solid substance, not very highly organized. A tumor of this kind may remain on the face unaltered for years, and then, when the patient gets old, it may begin to ulcerate. The ulcer spreads slowly but constantly, and if it be left alone it may destroy the whole of the cheek, the bones of the face, and ultimately the patient's life."

These soft brown tubercles, readily breaking down under the curette, are quite vascular, and distinct in their appearance from the pearly nodule which characterizes the early stage of the ordinary epithelioma of the face. I have seen them attain the size of a chestnut, or larger, before ulcerating. The ulcer which results from the breaking down of these nodules is irregularly circular in outline, the border slightly if at all elevated, smoothly rounded, soft, or slightly tuberculated, and not, as a rule, very much everted or undermined.

The base of the ulcer may be deeply excavated with unequal levels, but rarely gives rise to papillomatous outgrowths. The distinguishing feature of rodent ulcer from the ulceration of ordinary epithelioma is the disproportion existing between the ulceration and new growth (Fig. 1, Plate XXI). The amount of infiltration or new deposit about the base and edges of a rodent ulcer is much less than in the usual variety of skin cancer, while the ulceration is more marked. The course of the affection is, moreover, slower, slightly if at all painful, seldom or never affecting the lymphatics, and attended with little discharge.

The ulceration following or attending other forms of superficial epithelioma of the skin, when situated at a distance from mucous membranes, is identical with or so closely resembles rodent ulcer as to render a differential diagnosis difficult or impossible. It is probable that several species of superficial skin cancer, at a certain period of their stage of ulceration, may assume the clinical appearance of a rodent ulcer, and the opinion is held by a large number of dermatologists that the name, if used at all, should only be employed in its clinical signification, and not to indicate a distinct species. The fact that deep-seated epithelioma may develop from typical examples of rodent ulcer and infect the lymphatics, is an argument in favor of this view, as is also the superficial character and comparatively benign nature of the epitheliomata which occur in the usual location of rodent ulcer. The pathological anatomy of all the varieties of the disease will be discussed under one heading.

Pathology and Morbid Anatomy.—It is scarcely necessary to state that epitheliomata, of whatever nature, must have their origin in pre-existing epithelium, whether it be from the surface epidermis or the epithelial lining of glands. This fact, affirmed by Hannover in 1852, was established definitely for cutaneous cancers by Thiersch (Der Epithelialkrebs, namentlich der Haut, Leipsic, 1865). The theory of Virchow, that the cells in alveolar carcinoma originated from connective tissue, though held for many years, was disproved by the work of Waldeyer, who showed that such cancers owed their origin to the proliferating epithelium of the affected glands.

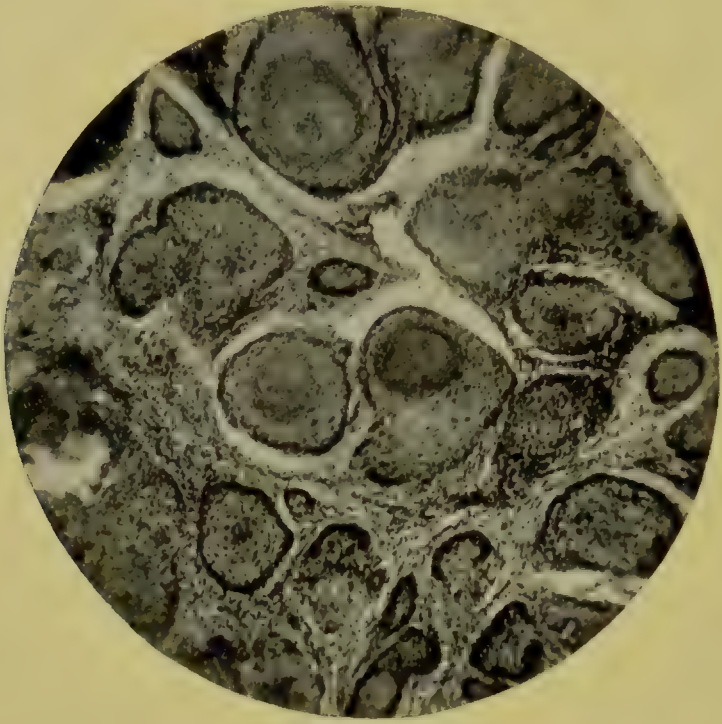

FIG. 70.—Section of squamous-celled epithelioma of the skin, showing epidermic "globes." × 50.

The class of epitheliomata which especially interest the dermatologist originate from the pavement epithelium of the skin or mucous membranes, and usually occur in two forms, the *lobulated* and the *tubular*. In the first, the cells undergo an evolution similar to the cells of the epidermis, reproducing from the periphery to the center the physiological process which takes place from the rete Malpighii to the stratum corneum—in other words, concentric layers of cells are encountered, representing the different layers of the epidermis, in the center of which are horny cells or cells which have undergone an imperfect conversion into horny tissue. The centrally located cells may in certain instances undergo a colloid degeneration, and in the same section epidermic "globes" or "bird's-nest bodies" may be seen, inclosing both horny, colloid, fatty, or granular cells (Fig. 70).

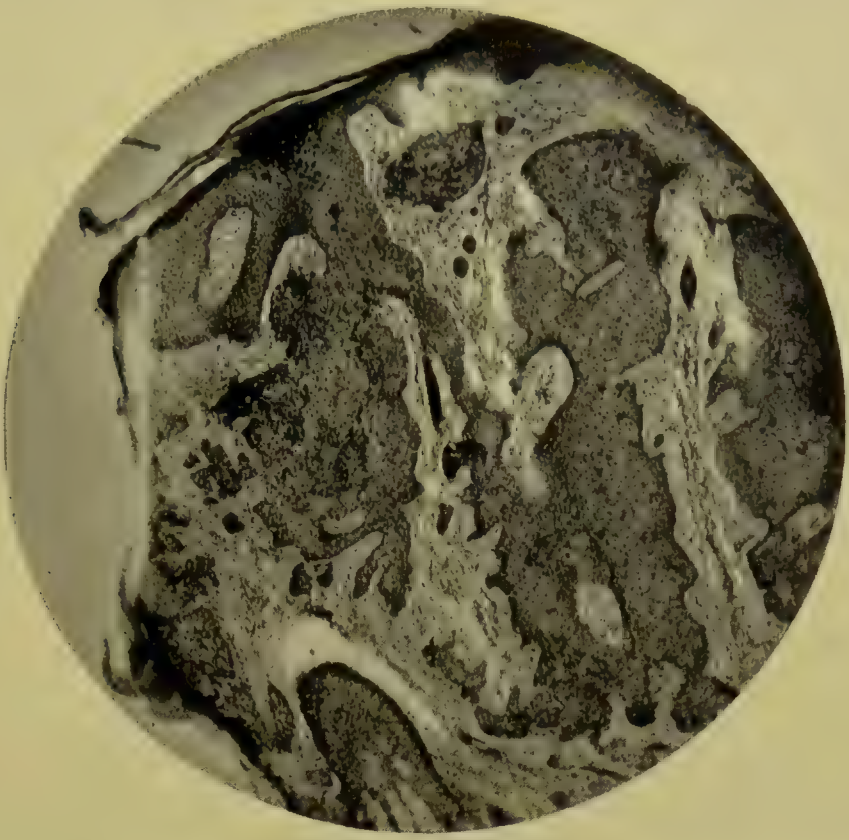

FIG. 71.—Section of squamous-celled epithelioma of the skin, showing down growth of the surface epithelium with branching processes. × 25.

The pathological changes in this variety of epithelioma may be studied to advantage in sections through the waxy nodules at the periphery of an epitheliomatous ulcer. These nodules may be seen to consist of down growths of the interpapillary portions of the rete Malpighii, which branch, intercommunicate, and give off buds and processes which act as new centers of growth (Fig. 71). Sometimes the proliferating epithelium may be traced as one continuous process, which assumes club-shaped and various fantastic forms. It is often difficult to ascertain the origin of the epithelial growth, for its original connection with the epidermis or its appendages may be by so narrow a pedicle that it has been destroyed by the ulcerative process in the progress of the disease. The epidermic "globes" or "bird's-nest bodies" may be seen in these downgrowths from the surface, or in the lobules detached from them. They are more numerous in the deep-seated epitheliomata, but may exceptionally be present in any of the varieties spoken of. Other lobules may be noted surrounded by a single layer of deeply stained cylindrical cells, inclosing prickle cells like those met with in the epidermis, showing no tendency to cornification (Fig. 72). In the same tumor a budding from the hair-follicles, sebaceous glands, or sweat glands may be seen, which does not necessarily indicate that the original point of departure was from these structures, but only an activity in all the epithelial tissues. In rapidly growing tumors the cells are altered by mutual pressure, so that they often assume the form of spindle cells, and, when seen apart from their connections, could readily be mistaken for the spindle cells met with in sarcoma. These epithelial lobules are surrounded by the connective tissue into which they have grown, which may be somewhat thickened, the seat of a round-celled infiltration, intermingled with epithelial cells, or be almost normal. No transition forms exist between the exudation cells of the stroma and

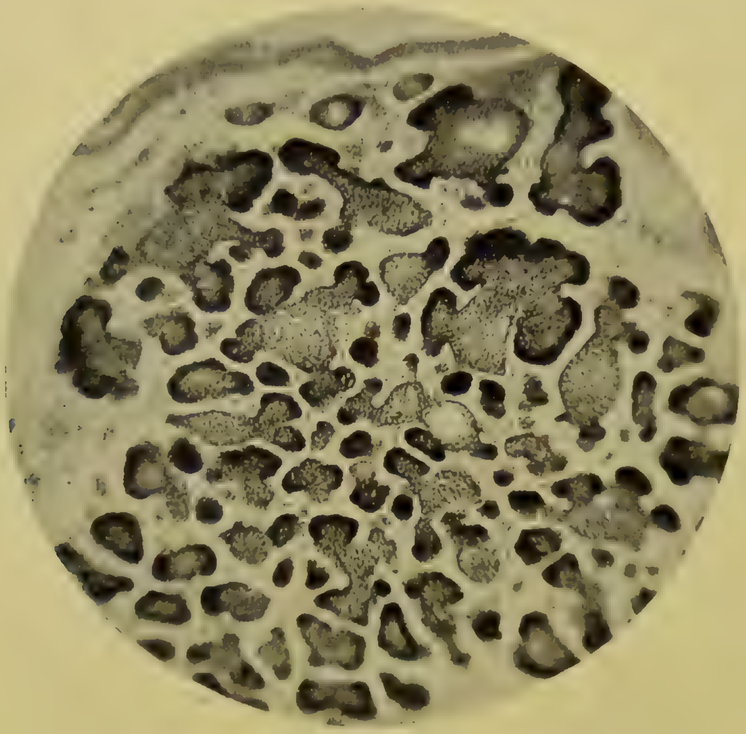

FIG. 72.—From superficial epithelioma of the face, showing club-shaped processes running parallel with epidermis. × 50.

the epithelial cells of the new growth. The blood-vessels of the surrounding connective tissue do not penetrate the cell masses. The inflammatory cell exudation in the connective-tissue stroma about the growing epithelium is produced by the irritation to which it is subjected, and in part, perhaps, by a secondary or mixed infection with pus cocci. In a section from an epithelioma of the lip showing very marked inflammatory changes in the connective tissue, I was able, by Gram's staining method, to detect staphylococci in large numbers. Whereas the cells in the lobular epithelioma are larger and show a marked tendency to the production of concentric globes containing horny tissue, in the tubular variety there is little or no tendency in this direction, although transition forms may sometimes be met with in which the characteristics of both varieties are seen.

The *tubular epithelioma* may originate from the epidermis or appendages of the skin. It usually starts from the rete Malpighii, or the outer sheath of the hair-follicle (Fig. 73), sending out cylindrical processes which freely anastomose with each other. The cells of which these processes and masses are composed are smaller than in the first-described variety, corresponding to the deeper cells in the stratum Malpighii, or the cells in the outer root-sheath of the hair; they seldom or never show a tendency to form concentric bodies or to undergo horny degeneration. Fig. 74 represents the epithelial cell masses met with in this variety of epithe-

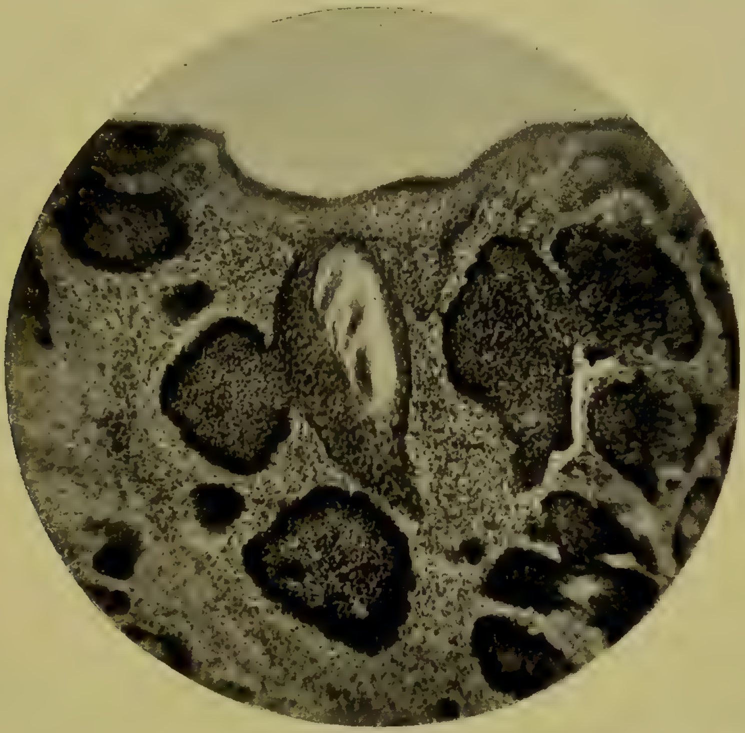

FIG. 73.—Section from rodent ulcer of the face, showing outgrowth from hair follicle and other epithelial masses. × 75.

lioma. In the section from which this photomicrograph was taken the lowermost layer of the rete Malpighii seemed to be the point of origin of the new growth. The cells at the periphery of the tubular prolongations, as in the other variety, may be cylindrical, like those in the basal layer of the epidermis, staining much more deeply than the cells which they inclose. Instead of being perpendicular to the surface, these tubular prolongations may be parallel to the epidermis, and assume glandlike outlines, as if attempting to reproduce the gland from which they have been supposed to originate. The investigations of Darier (Archiv de Méd. Expérimentale, etc., 1889) have shown that the sebaceous origin of epithelioma is rare, and that the form which the cell masses assume does not at all indicate such a departure. Such a starting point may be admitted, according to this writer, when the epithelioma begins in a gland which has undergone cystic degeneration, of which a number of examples have been quoted. A patch of verruca seborrhoica may be the beginning of an epithelioma, and this pathological condition was supposed to represent

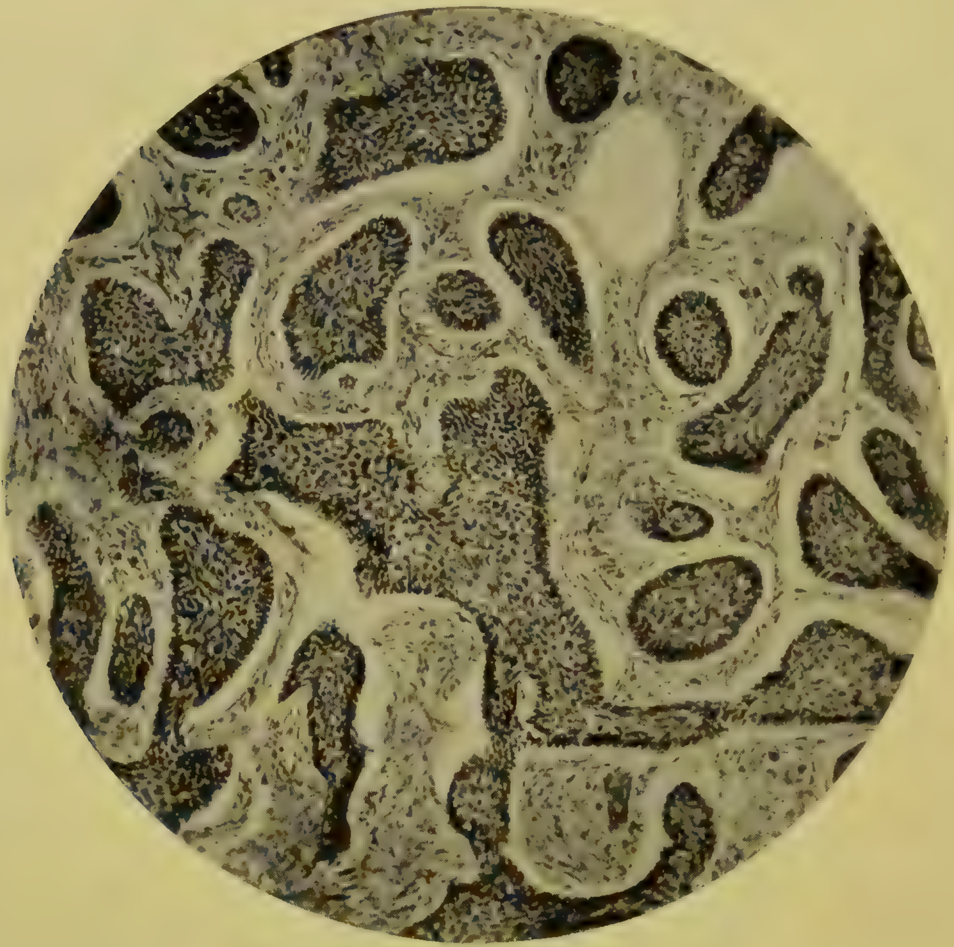

Fig. 74.—From rodent ulcer of the face, showing small-celled epithelial processes imbedded in fibrous stroma. × 150.

some diseased condition of the sebaceous glands. It is doubtful, however, if such is the case, for Pollitzer's investigations of these senile warts (Brit. Jour. of Dermat., ii, 7) revealed a decided hypertrophy of the rete Malpighii, thickening of the horny layer, together with groups of epithelioid in the papillary and subpapillary layers of the derma. The sebaceous glands in the sections examined by himself were unchanged.

The epitheliomata which originate from the walls of sebaceous cysts or glands may, according to Darier (*loc. cit.*), assume the lobulated form, with or without concentric globes, the tubular form, become calcified, or at the same time present all the different histological aspects of epitheliomata from the indifferent cells of the epidermis.

A wide difference of opinion exists among equally good pathologists regarding the part played by the sweat glands in the production of the tubular epithelioma. While it is admitted by many that their epithelium may proliferate in many forms of skin cancer, it seems difficult to determine in what class of cases this proliferation is primary. The slow clinical course and nonimplication of the lymph glands were supposed, among other symptoms, to indicate a growth which took place at the expense of the sudoriparous glands. When in a growth of this character epithelial processes recalling the shape of the sweat ducts were encountered, the conclusion was reached that their glands were their original point of departure. It is an error to suppose that any universal law can be formulated from either the clinical course or histological structure of such growths; their location on the skin away from the mucous orifices, where there is less irritation and less vascularity and lymphatic supply, as has been observed by Besnier, Hutchinson, and others, seems to have more to do with their benign course than a fixed origin or structure. I have examined many cases of such epitheliomata from the face, presenting typical tubular prolongations of epithelium, with no tendency to the formation of horny epithelium, and very frequently could trace their origin to the interpapillary processes of the rete or to the hair-follicles, both the sweat and sebaceous glands being unaltered. While it is not denied that either or both of these glands may give rise to the tubular epithelioma, the proof that such is the case is difficult to obtain, as the ulcerative process so soon destroys the tissues which may be first involved.

Pathology of Rodent Ulcer.—It is probable that the pathology of this affection is identical with that of the tubular epithelioma just described. Thin (On Cancerous Affections of the Skin, London, 1886) has expressed this view, and has endeavored to associate it with a sweat-gland origin. He does not believe it to be identical with an epithelioma starting from the rete Malpighii, though admitting that the clinical diagnosis is not always easy to make. Thiersch and Butlin believe it to have a sebaceous origin; Tilbury Fox, Colcott Fox, and others, from the hair-follicles. Warren, in this country, described it as a small-celled epithelioma from the rete Malpighii. Paul, Boyce, and Darier describe it as a slow-growing epithelioma which may originate in any of the skin structures. Walker (Brit. Jour. of Dermat., September, 1893) is the most recent advocate of the glandular origin of rodent ulcer. His argument is that in its structure it corresponds to glandular cancer, and that when carcinoma of the breast secondarily attacks the skin it is almost identical with rodent ulcer. In most of his cases he was able to trace an origin to the sweat glands. The slow course of the ulcer was attributable to the normal slow growth of the glandular epithelium, the rete cells having a rapid growth. Walker has been more successful than the majority of workers in tracing a sweat-gland origin of these growths. His observations, if confirmed, will render our knowledge of malignant growths of the skin more accurate, and end much of the discussion regarding the origin and nature of rodent ulcer. In sections of cancerous tissue fixed in Flemming's solution, or fixing agents of like character, a large number of pathological mitoses or abnormal divisions of the cell nuclei may be found. Some conclusion regarding the rapidity of growth and, it is believed, the malignancy of the tumor, may be reached according to the number, size, and position of these asymmetrical karyokinetic figures in the cells of the growth. In cancer of the mucous membrane of the lip I have found mitoses in much greater numbers than in the so-called rodent ulcer.

Etiology.—We possess little positive knowledge concerning the general etiology of cancer. The many theories put forth have not been regarded as sufficiently comprehensive to explain all the phenomena of the disease. Cohnheim's theory of embryonic cells left over in fœtal development and cut off from their own tissue, capable in later life of developing into activity and giving rise to various benign and malignant new growths, was and is yet accepted by many pathologists as accounting for more facts than any hypothesis with which we are acquainted. While true for dermoid cysts and certain other benign tumors, it has never been proved, and it is extremely improbable that embryonic "rests" or "remains" actually exist where malignant tumors originate. This statement should be somewhat modified, as certain carcinomata as well as sarcomata with a high degree of malignancy do arise from congenital warts and moles. It is not the rule for cancer to develop from a mass of cells or tissue separate from its surroundings, but from epithelium in its normal relations. This epithelium grows as if under the influence of some stimulant; the bordering tissue is infected, and metastatic growths are produced as in other infectious diseases. Auto-inoculation, though not usual, has been observed in a number of instances where the secretions from cancers have passed over healthy epithelial surfaces. It occurs on parts exposed to the air and after traumatisms, which open the way for an infective agent. Though the facts proving its contagiousness are few, evidence of this nature is accumulating, and a number of instances are authentically related which would point to a certain geographical or endemic distribution of the disease.

Thiersch supposed the wasting of the connective tissue in older individuals favored the ingrowth of the surface epidermis by removing the barrier normally existing between the two structures. The occasional occurrence of cancer in young people in a more malignant form than in adults speaks against this theory. Among the causes which favor the development of cancer, the best known and most potent is undoubtedly *chronic irritation of the tissues of slight intensity.* This is well illustrated in the cancer of the lower lip, which occurs in more than ninety per cent of all cases in smokers, and especially among those who use a pipe. Its occasional occurrence in others has been traced to the habit of constantly chewing a toothpick, and in fishermen to drawing the cord of the fish net through the mouth. In women, cancer of the lip or tongue is of the greatest rarity, the few women who have been victims to cancer of the lip having been smokers.

Its development from cicatrices of burns and other lesions, fistulæ, corns, warts, ulcerations, etc., may be explained on the ground of prolonged irritation, or the opportunity afforded for the entrance of some infective material.

Soot, paraffin, and tar cancer have already been referred to. Surfaces irritated by discharges from mucous membranes or altered glandular secretions, or from chronic eczema, may in like manner give rise to cancer. I have seen cancer of the nose develop from the skin pressed upon by the *pince nez.*

The development of cancer and sarcoma of the skin from the peculiar condition known as xeroderma pigmentosum is difficult to explain. The down growth of the surface epidermis met with in lupus as a consequence of inflammatory changes in the connective tissue, as well as in syphilitic and other chronic ulcers, is sometimes difficult to differentiate microscopically from the early stages of epithelioma. Such epithelial proliferations, though generally of a benign character, have been supposed to favor the cancerous process. A transformation or degeneration of lupus or syphilis into cancer, in the strict sense of the word, does not occur.

The origin of epithelioma of the tongue is usually associated with some irritating cause, as in epithelioma of the lip, with the smoking of a pipe, the irritation from a ragged tooth, or defective tooth-plate. Syphilis and the irritating influence of tobacco smoke undoubtedly predispose to leucokeratosis of the tongue and buccal mucous membrane, and thus indirectly favor the evolution of epithelioma of this organ. The keratosis produced by the internal administration of arsenic and patches of psoriasis, which represent a somewhat analogous condition of the skin, have been observed as the starting point of epithelioma.

Age.—Though no time of life is exempt, it is more frequent after the age of forty. Kaposi has observed it a number of times between the ages of eight and eighteen years, and from that time on. Walker thinks the age at which rodent ulcer begins is usually placed too high. His own statistics gave the average time of commencement at about forty. Cancer of the skin and mucous membranes are, according to Crocker, five times more frequent in the male than the female. The use of tobacco, and the irritation to which the face and extremities are subjected, probably account for the larger percentage of cases in the male. von Winiwarter's statistics show that the male is affected about three times as frequently as the female. Heredity has little or no influence in producing the form of cancer in question.

Parasitic Theory.—The advocates of this theory, who are rapidly increasing, look upon all the previously named causes as predisposing only. The true explanation of cancer, like that of the infectious diseases, must be sought for in some cause outside of the body. The very marked differences between the tissue growth of carcinoma and an inflammatory tumor caused by vegetable parasites exclude the possibility of considering them in such a relationship, so that it was not until the pathogenic importance of protozoa was recognized that they were considered a possible cause of cancer. The fact has been established of late years by numerous investigators that parasitic protozoa may cause disease, and that certain varieties can inhabit epithelial cells and cause them to proliferate. As examples of such affections brief mention may be made of the following:

The *coccidium oviforme*, a protozoön found in the rabbit's liver and intestines, penetrates the gall ducts and gives rise to small adenomalike tumors composed of proliferating epithelium, histologically not unlike carcinomata originating from the glands of the rectum.

Molluscum contagiosum is also an epithelial tumor. It is contagious, and probably caused by a protozoön not yet isolated. The bodies found by Darier in the affection first described by himself as *psorospermosis follicularis vegetans* were recognized by Malassez and Balbiani as protozoa. Although this opinion has been criticised since by numerous writers, no good reasons have been given to show that they are not parasites. The reactions produced in the tissues are similar to those in the other epithelial growths, which are believed to be caused by protozoa. Bodies of like appearance have also been found in *Paget's disease of the* *nipple.* The organisms met with in the blood of malarious subjects belong to the same family.*

Bodies supposed by competent observers to be protozoa are found in the epithelial cells of cancer. They are generally present in the cell protoplasm, pushing the nucleus of the cell which they inhabit to one side. Exceptionally they have been found in the nucleus of the cell itself. In many instances a capsule surrounding the parasite can be made out.

As met with in the cells of cancer they are round or oval bodies, 0·004 μ to 0·04 μ in size, with a central nucleus surrounded by a layer of protoplasm, which stains less deeply than the nucleus. An infected cell usually contains one protozoön, but as many as fifteen have been found in a single cell (Ruffer and Walker). They are more numerous in the growing edge of secondary tumors, and can be differentiated from the cell which they inhabit and its nucleus by the difference in reaction to staining agents which they exhibit. The best preparations are obtained by placing the freshly excised tissue in Flemming's or Foa's solution, or a one-per-cent osmic-acid solution, subsequently hardening in alcohol and staining with Biondi's reagent, or with hæmatoxylin and eosin.†

Welch, Noeggerath, Török, Gibbs, Adler, and others have criticised the claims of those advocating a parasitic cause for cancer, and believe that many of the structures taken for parasites are various forms of cell degenerations, vacuole metamorphosis of the cell protoplasm, inclosures of white or red blood-corpuscles in the epithelial cells, with subsequent degeneration and scattered fragments of the nuclei of leucocytes, changes in the number and size of the nuclei, changes in the nuclear chromatin, invagination of one cell in another, etc.

The criticisms on the parasitic nature of these bodies have been carefully reviewed by Ruffer and Plimmer (*loc. cit.*); and while it is not denied by them that such cell inclosures and degenerations may take place, and that many such appearances have been mistaken for parasites, there yet remain certain bodies which can, from their appearance and staining reactions, be sharply differentiated from the pseudo-parasites and cell degenerations. With our present knowledge of this subject, it can only be stated that cancer cells have, in a certain number of instances, been found infected with bodies which are probably parasitic protozoa, and that the new growth may be dependent upon the entrance of these bodies into the epithelial cells. Until, however, some method of cultivating the organisms is devised, together with the artificial production of the disease, their exact relationship to cancer must remain hypothetical.

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* A full consideration of the pathogenic relationship of protozoa to disease, both in animals and man, may be found in Ludwig Pfeiffer's Die Zell-Erkrankungen und die Geschwulstbildungen durch Sporozoa. Jena, Verlag von Gustav Fischer, 1893.

† It is only possible in a work of this character to refer in the briefest way to this interesting subject. For further information regarding staining methods, and all details of technique, the reader should consult the articles of Ruffer and Walker, and Ruffer and Plimmer (The Journal of Pathology and Bacteriology, vol. i, Nos. 2 and 4, 1892, 1893; and vol. ii, No. 1, 1893). Also Soudakewitch (Annales de l'Institut Pasteur, tome v, No. 3, p. 145 1892; and ibid., tome vi, 1892, p. 545). In Ruffer and Walker's article a full list of references may be found.

Diagnosis.—Attention to the points given in the description of the clinical features of cancer of the skin will be sufficient in the greater number of cases to establish the diagnosis. The presence of a chronic ulcer in the places of election, with elevated pearly edges, everted or undermined, occurring after forty years of age, or exceptionally at any time of life, should excite the suspicion of epithelioma. A *chancre* of the lip or tongue may be mistaken for an epithelioma. The lymphatic glands beneath the lower jaw enlarge much earlier after the occurrence of the primary syphilitic sore than in *epithelioma*, and the appearance of the secondary eruption renders the diagnosis unmistakable. The distinct clinical features of the two processes should enable the experienced observer to make the diagnosis at a glance.

Cancer of the tongue is not infrequently mistaken for a *gumma* of this organ, and often the therapeutic test is required to render the diagnosis clear. The differential diagnosis between a deep-seated epithelioma and an unbroken gumma is especially difficult, and often impossible, by their clinical appearances alone. An epithelioma is generally single, while two or more gummata may be met with. An epithelioma is apt to develop beneath a patch of leucokeratosis. On the other hand, a tongue which is fissured and scarred by syphilitic surface lesions may be the seat of a gumma. The ulcers which result from the breaking down of the two processes may be differentiated by attention to the following points: The edges of the *gummatous* ulcers are usually more undermined, while there is much less elevation and nodular condition of the borders than in cancers; papillary outgrowths are more usually met with in cancers than in syphilitic processes. The induration of an epithelioma of the tongue is deeper and more extensive than that about a gumma. *Gummata* are more frequently met with on the dorsum of the tongue, while *epitheliomata* occur oftener at the borders. It is the exception for the lymphatic glands to be involved in late syphilitic lingual affections, while in cancer of the organ glandular enlargement sooner or later takes place.

A *tubercular ulcer of the tongue*, which is but seldom met with, is generally associated with tuberculosis of the lungs, while miliary tubercles can be detected about the periphery of the ulcer. An *epithelioma* of the penis may be mistaken for a *chancre;* but if the case be under observation for a sufficient time to permit constitutional syphilis to develop, no difficulty should be encountered in arriving at a correct diagnosis.

Epitheliomata of the skin may be mistaken for *syphilitic ulceration* or *infiltration*, or for *lupus*. The rapid course of syphilitic lesions, which are frequently multiple, and the absence of the characteristic border, enable us to make the diagnosis in the majority of cases. Epitheliomata not infrequently develop on old syphilitic and lupous ulcers, and then the diagnosis sometimes presents difficulties. *Lupus* is a disease which develops early in life, pursues a very chronic course, and presents the characteristic brownish-red tubercles. The presence of induration or pain about the base of a wart, in a person past middle life, should excite the suspicion of a beginning malignant process. In any case where the diagnosis is obscure, it may be rendered certain by the histological examination of an excised portion of the growth.

Prognosis.—This is more unfavorable in epitheliomata on the lip, tongue, or mucous membrane in general than in those on the cutaneous surface. As a rule, malignant growths in the former localities spread more rapidly, and sooner produce general infection through the lymphatic system. If seen sufficiently early, cancers of the lip may be permanently cured by radical surgical methods, though this good result is attained in the minority of cases only of epitheliomata of the tongue. In the superficial variety on the skin the prognosis is favorable, as neither the deeper structures nor the lymphatics are often involved, and the process is very slow. In the nodular or the papillary varieties the prognosis is not so good, as after one to three years, if not treated, extension to the lymphatics will probably take place, with all the evil results of generalized deposits in the internal organs.

The prognosis of the clinical variety—rodent ulcer—is comparable to the superficial epithelioma. It is well to bear in mind that all the superficial varieties of epithelioma may extend to the underlying tissues and produce local destruction of tissue and general infection, as in those which are deep-seated from the beginning.

Treatment.—All internal remedies which have heretofore been employed in the treatment of cancer have proved to be of little use. Arsenic, which had some reputation years ago, had practically been discarded until Lassar (Berl. klinische Wochensch., p. 537, 1893) revived its use in these cutaneous growths. He reports a number of cases in which apparent cure resulted from its internal use, combined with local hypodermic injections of it into the neoplasm. The curative results claimed by Adamkiewicz (Untersuchungen über den Krebs, Wien, 1893) for a toxine obtained from cancerous growths, regarded by him as secreted by cancer parasites, have not been confirmed by later investigators, and we must infer that his conclusions are erroneous.

The only effectual method of treatment is early and complete removal of the new growth, whether it be by the knife, caustics, the actual cautery, or a combination of these methods. When situated on the tongue, or when the lip is extensively involved, the knife is the only method which promises good results. Partial removal, or the application of caustics which produce an irritation without complete destruction, only stimulate the growth to increased activity.

When superficially situated in the skin, and of limited extent, a cure may frequently be effected by a thorough curetting of the diseased tissue, followed by the application of a twenty-five-per-cent ointment of pyrogallic acid. The ointment should be kept constantly applied, and changed each day for a period of five or six days; it excites suppuration, and destroys the diseased cells left behind by the curetting. It has the further advantage of being painless. The resulting ulcer may be treated by some indifferent application. The writer has successfully treated a number of cases of the variety in question in this manner. Reappearances *in situ*, which may take place after a few weeks or months, should be treated in the same manner. The resulting scar is less than after an excision. In case the disease is more extensive, a paste of chloride of zinc will accomplish the result more rapidly and surely than the foregoing method, and is an excellent substitute for Marsden's arsenical paste, which was formerly much used. A formula introduced by Bougard, a Brussels surgeon, has been extensively used in this city by Lewis, Robinson, and others with good results, and is as follows: ℞ Farinæ tritici (wheat flour), amyli, āā 30; acid. arsenios. (pulv.), ·5; hydrarg. sulphid. rubri (cinnabar), 2·5; ammon. muriat., 2·5; hydrarg. chlor. corros., ·25; zinc chlor. (cryst.), 30; aquæ fervid., 45.

The first six substances should be separately ground to a fine powder; they are then mixed in a glass mortar, and the chloride of zinc, previously dissolved in the hot water, slowly added, while the powder is rapidly stirred with the pestle. After standing for twenty-four hours the paste is ready for use. The paste is spread on a piece of muslin and applied to the parts for twenty-four hours. The surface may be previously curetted or denuded with caustic potash, if not already ulcerated, as more prompt results are thereby secured. The advantages claimed for this application are that it can be applied to a larger surface, is less painful, and produces a drier and more friable slough than that resulting from the use of Marsden's paste. Its action can be rendered much less painful by the addition of ten to twenty per cent of cocaine, and by adding more water to the paste, so that it be not too dry (Robinson). The ulcer which remains after the slough has separated may be treated by a simple ointment, or one containing iodoform, aristol, or balsam of Peru. If any diseased tissue has been left behind, of course the same procedure may be repeated.

Should the growth be situated upon a part of the body where the skin is freely movable, so that union of the wound by first intention can be secured, an excision with the knife may be preferred. The method to be employed will depend upon the location of the growth, its size, and to some extent the wish of the patient. Many patients are so prejudiced against any cutting operation that they will endure the more prolonged and painful action of caustics rather than submit to the more formidable operation with the knife.

CARCINOMA OF THE SKIN.

Lenticular Carcinoma.—This is one of the rarer forms of cutaneous cancer. It usually occurs in the female, on the breast, as a secondary involvement of the skin over a mammary carcinoma, or first appears in the line of the cicatrix of a former operation for malignant disease of this gland. White or pinkish papules situated in the skin or projecting above its surface, from the size of a small shot to that of a pea, are first noticed, by confluence forming larger infiltrated patches, which may or may not undergo ulceration. The affected skin is generally hyperæmic, and traversed by enlarged blood-vessels. The process extends in a peripheral manner, in some cases involving the greater part of the skin of the chest, both in front and behind, even extending to the arms and abdomen. The affected skin becomes thickened, hard, and leathery in consistence from the growth and contraction of connective tissue, giving rise to the condition called *cancer en cuirasse*, a term first used by Velpeau. When it involves a large territory, respiration may be difficult, and the lymphatic circulation so obstructed that the arms become swollen and their motion impeded. Death takes place from cachexia, owing to cancerous deposits in internal organs or from some intercurrent inflammation. Morrow (Jour. of Cutan. and Ven. Dis., p. 1, 1884) reports, with a colored plate, a remarkable case of this kind, in which the process had involved a large portion of the skin of the trunk. Innumerable milialike bodies were scattered over the entire area affected, and were characteristic of the advancing disease. On incising them, a comedolike mass could be extruded. Hyde (Am. Jour. of the Med. Scien., p. 235, vol. ciii, 1892) reported two similar cases, in one of which the process seemed to develop primarily in the skin. Besnier and Doyon (in their notes appended to the French translation of Kaposi's Pathol. und Ther. der Hautkrankh.) refer to several cases of *cancer en cuirasse*, which developed primarily over the female breast without a previous implication of the gland. In both Morrow's and Hyde's cases microscopic examination showed the affection to be of the alveolar or glandular type of carcinoma.

Tuberose Carcinoma.—This still more unusual variety may occur on the face or extremities, or, in fact, on any portion of the body, in the form of papules imbedded in the skin or subcutaneous tissue. They grow to hard and irregularly nodular masses, which may attain the size of a hen's egg or larger, of a brownish-red or purple tint, simulating at times a sarcoma. Adhesions form to the epidermis, and the deposit breaks down into deep ulceration. They are usually accompanied with similar deposits in the internal organs. In a case of Röseler's, quoted by Crocker, a large number of such growths appeared simultaneously beneath the skin, breaking down into ulcers, and causing the death of the patient within eight months after the onset of the disease.

Pigmented Carcinoma.—Brief reference was made among the clinical varieties of epithelioma to the origin of malignant tumors from nævi, and the statement was there made that the majority of such growths were sarcomata. Such congenital or acquired nævi may give rise to carcinomata, and in very exceptional instances the pigmented moles may be the starting point of a pigmented cancer in which the coloring matter is deposited in the epithelial cells and stroma of the new growth. Dieterich (von Langenbeck's Archiv, xxxv) has collected one hundred and forty-five reported cases of melanotic tumors, among which his analysis seemed to show that eighteen were melano-carcinomata, although some of the cases were so indefinitely reported that it was not possible to determine to which class they belonged. Clinically, it is impossible to differentiate this class of tumors from the sarcomata. They may develop on any part of the body, generally on the extremities or genitals, from moles or independent of them. The tumors appear as small, bluish-black, or slate-colored growths, semisolid in consistence. They may attain considerable size, assuming warty or fungouslike forms, which generally undergo rapid ulceration. Secondary growths sometimes develop about the original tumor, and along the communicating lymphatic vessels similar dark-colored papules appear. Metastatic tumors develop rapidly in the viscera, and the death of the patient results from marasmus, sometimes within a few months after the development of the primary growth. The prognosis of these varieties of malignant growths is almost equally unfavorable. In the pigmented variety, unless early extirpation be complete, operative interference only hastens the spread of the affection.

SARCOMA CUTIS. (J. A. Fordyce.)

Derivative, σάρξ, flesh.

Definition.—Sarcoma may be defined as a malignant new growth composed of incompletely developed or embryonic connective tissue. It may originate as a single primary pigmented or nonpigmented tumor in the skin, as a primary cutaneous generalized sarcomatosis, or secondarily as a metastasis from the primary disease of another organ. Its clinical forms are obscure and manifold, and undergo changes with its development and stage. Transition forms may exist between well-recognized types of the affection.

Melanotic Sarcoma.—This variety develops primarily or secondarily in the skin. When primary, the new growth is single. It may originate from a pigmentary nævus, chloasma, or other pigmented spot, the uveal tract, xeroderma pigmentosum, or as a discoloration of the normal skin. The initial change may be a spot of purpura, or dilated capillaries (Funk). The primary growth may be situated on any part of the body. It has been noted by Duplay, Hallé, and Hutchinson as a discoloration at the border of the nail, from which a fungating, pigmented tumor subsequently springs. The latter writer has given the affection in this locality the name of "melanotic whitlow."

When a pigmented mole becomes sarcomatous the changes which take place are sometimes insignificant. A small fungous outgrowth or ulceration of the mole may occur, exciting little suspicion until metastasis has taken place. Exceptionally, large, soft, fungous tumors grow upon these congenital nævi. The initial tumor when first seen is small, generally flat, sessile, dark brown or bluish-black in color, and of hard, semi-soft, or elastic consistence. It rapidly reaches the size of a pea or hickory nut, when it may remain stationary, ulcerate in the center, discharging a brownish-black fluid, or exceptionally undergo spontaneous involution. Within a few weeks or months secondary tumors may develop about the primary growth or in the skin at a distance ; a large, lobulated mass may result from the confluence of several smaller growths. Generalization takes place through the veins, causing secondary tumors in the liver, intestines, or lungs, or by way of the lymphatics, giving rise to large, lobulated, adherent, dark-blue masses in the communicating or other lymph glands. Death usually results within a few months to one or two years, and is preceded by cachexia, fever, or the development of tumors in the brain or other organs essential to life. In the last stages of the disease a general melanosis is at times met with, characterized by a brownish-black discoloration of the skin, especially of the exposed parts, and dark-colored urine from the pigment granules contained therein ; the blood also is loaded with pigment derived from the tumors.

Histology.—The cells composing the tumor are generally spindle-shaped, but may be small or large round cells. These melanotic tumors may assume the alveolar type. The pigment is deposited in a part of the cells, and sometimes in the surrounding fibrous tissue, in the form of brown or black amorphous granules. These characteristics obtain in the secondary tumors of the viscera and glands, as well as in secondary skin tumors from a primary growth in the choroid.

The secondary tumors are often more deeply pigmented than the primary ones. The exact nature of the pigment and the manner of its formation are not known. According to the investigations of von Nencki, it is rich in sulphur and does not contain iron.

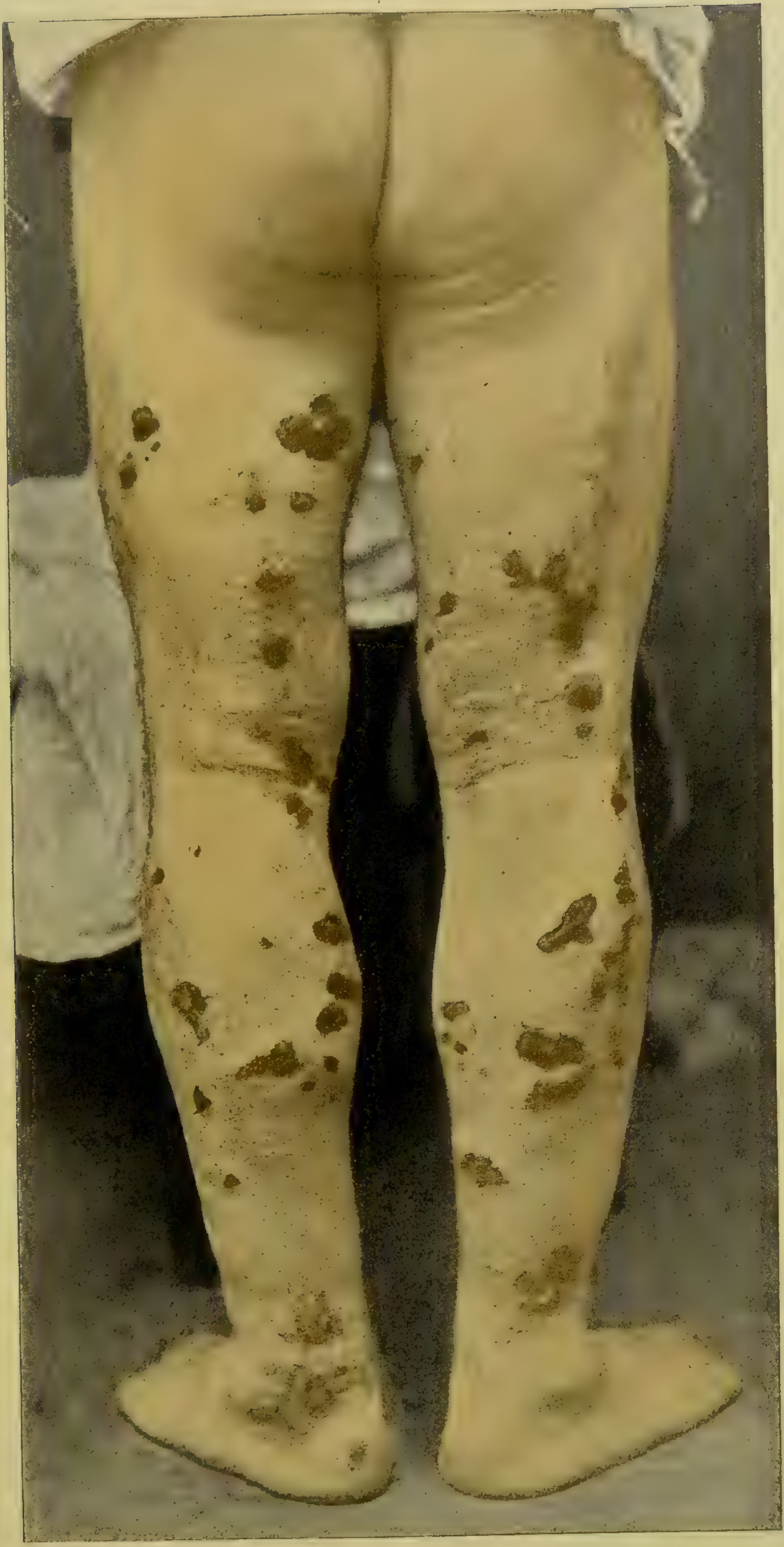
Diagnosis.—A pigmented growth developing in connection with a congenital mole is in the great majority of cases a sarcoma; exceptionally, a carcinoma of equal malignancy may have such an origin, and can only be differentiated by microscopic examination. Sometimes the changes which take place in the primary affection are so slight as to attract little or no attention until too late to hope for benefit by operative interference.

Prognosis and Treatment.—This is the most rapidly fatal of all the sarcoma group. Unless a radical removal of the growth is effected very early in its course, its growth and dissemination are hastened by an operation. Arsenic has no influence over this variety of sarcoma.

IDIOPATHIC MULTIPLE PIGMENTED SARCOMA (KAPOSI).

This variety was first described by Kaposi, in 1879, whose original communication was based upon the observation of five cases, all of which proved fatal. He has up to this time (Path. und Ther. der Hautkrankheiten, Vierte Aufl., Wien, 1893) seen sixteen cases, all in men. Following his description, other cases have been reported by Vidal, Wigglesworth, Tanturri, De Amicis, Donner, Hardaway, Köbner, Hallopeau, Funk, Schwimmer, myself, and others. Recently, Brayton, of Indianapolis, has reported a case of long standing which clinically corresponded to this type, and was shown by microscopic examination to be sarcomatous. The affection usually develops simultaneously on the extremities as circumscribed tumors, occasionally first on the face or on other parts of the body; or as a diffused infiltration in or beneath the derma, of a dark-red or purplish color. The first growths may be pea-sized or smaller, or an infiltration as large as a silver dime. Subsequently other similar tumors appear on the legs, forearms, thighs, and arms, before the trunk or face is involved. They are more or less symmetrically distributed, sometimes grouped, and large masses of nodular infiltration may be formed by the confluence of several tumors. The growths are slightly painful, firm and elastic to the touch, some of the recent ones becoming smaller and paler on pressure. The older tumors, especially those on the lower extremities, are darker, almost black, and do not change color by pressure. The hands and feet may be much swollen by the diffuse infiltration and accompanying œdema, interfering materially with the movements of the parts, and giving them an appearance like elephantiasis. The epidermis is glossy in places as if from overdistention, while some of the tumors are erectile from the enlarged and newly formed blood-vessels, looking not unlike angiomata. A central depression occurs in some of

PLATE XXII.



Idiopathic Multiple Pigmented Sarcoma of the Skin (Fordyce).

the older growths, and dark pigment spots mark the situation of others which have disappeared by spontaneous involution.

The accompanying plate (XXII), from a photograph of a patient under my care, shows the color and distribution of the tumors over the lower extremities. Similar tumors were present on the upper extremities, and also broad bands of dense infiltration, almost completely encircling the arms.

Late in their course the growths sometimes undergo ulceration, producing deep discharging sores; this, however, is of rare occurrence in typical cases. Similar tumors are met with after two to five years on the mucous membranes, having a greater tendency here to break down. At this time, bloody diarrhœa, hæmoptysis, fever, and marasmus lead to death. At the autopsy tumors of the same character are found in the lungs, liver, spleen, and in the intestinal tract. In the descending colon sloughing tumors are met with in large numbers.

Histology.—In the case examined by myself the new growth extended from just below the epidermis to the subcutaneous connective tissue. Under a low power the structure of the tumor was seen to be composed of small fusiform cells arranged in bundles extending longitudinally, transversely, and obliquely, their transverse sections looking not unlike round cells. The blood-vessels were increased in number and size; vascular channels with thin walls were seen among the cells of the new growth; others seemed to have no proper walls, but communicated directly with the cells of the tumor. The name angiosarcoma has been given to these tumors which are rich in newly formed blood-vessels. The thinness of the walls of the vessels readily permits the dissemination of the tumor cells throughout the general circulation, thus explaining why metastases are more frequently met with in the viscera without previous implication of the lymph glands. The endothelium of some of the vessels showed active proliferation, resulting at times in complete obliteration of their caliber. Blood pigment and partially degenerated corpuscles were encountered in the vessels' walls and scattered throughout the section. The pigmentation of the tumors seemed to be due altogether to the hæmorrhages from the altered vessels, and not, as in true pigmented sarcoma, to the presence of granules within the cells. The examinations made by Schwimmer (Internat. Atlas of Rare Skin Dis., Part II, 1889) and Funk (Monatshefte für Prakt. Dermat., 1889) gave practically the appearance noted in the foregoing description. The majority of Kaposi's cases were of the small, round-celled variety. Pringle (Congrès Internat. de Dermat. et de Syph., Paris, 1889; Comptes Rendus, 1890) announced that in two cases of the affection he had found bacilli in the capillaries and sweat glands. An examination of sections from my own case for micro-organisms gave a negative result.

Etiology.—The cause of this, as well as the other varieties, is entirely unknown. The simultaneous occurrence of tumors on the extremities independent of a primary growth would suggest some form of infection through the general circulation. The majority of the cases reported have occurred in middle-aged men of the lower classes. All of Kaposi's cases (sixteen) were met with in the male. Köbner has reported the case of a girl aged eight. The exact nature of Köbner's case is somewhat doubtful; some writers quote it as an example of Kaposi's type, while others believe it to belong to another class.

Diagnosis.—When the tumors are confined to the hands or feet it is possible to mistake them for the *papular* or *papulo-squamous syphilide.* The *gummatous syphilide*, with which they might be confounded, differs in its more rapid evolution, its greater tendency to ulcerate, its color, and in the presence of scars from past lesions. *Mycosis fungoides* is differentiated by its primary eczematous and pruritic stage, the marked disposition of the tumors to undergo softening and ulceration, and their bright-red color, which is altogether different from the brownish-black or purplish color of the former. *Leprosy* is an affection with which this variety of sarcoma has sometimes been mistaken. The patches of anæsthesia which are generally met with in lepra, the bullous eruption, and the characteristic facies, will, as a rule, be sufficient to establish the diagnosis, which can readily be verified by a microscopic examination of a leprous nodule. *Lymphodermia perniciosa*, *molluscum fibrosum*, and *lupus* might be considered in arriving at a diagnosis.

Prognosis.—The great majority of the cases so far reported have proved fatal within from two to five years. The duration of others has been much longer, and in a few spontaneous recovery seemed to take place. Hardaway (Jour. of Cutan. and Ven. Diseases, p. 1, 1883, and Jour. of Cutan. and Gen.-Urin. Dis., p. 21, 1890) observed a case in which after sixteen years the patient was in good health, and from whom all the tumors had disappeared by spontaneous involution, leaving behind merely an atrophic condition of the skin. In Köbner's case (Berlin. klin. Woch., No. 2, 1883) the hypodermic use of Fowler's solution for a period of several months was followed by a complete disappearance of all the lesions; after five years no recurrence was noted.

In Brayton's case (Indiana Med. Jour., November, 1893) the disease had existed for twenty-five years, during which time a number of the growths had disappeared, while new ones developed.

In all these instances of long duration the diagnosis of sarcoma was confirmed by microscopic examination.

Treatment.—Although the administration of arsenic has been repeated in many cases, Köbner alone has been successful in obtaining a cure by means of it.

Kaposi, who has seen more examples of this variety of sarcoma than any single observer, has had no beneficial results from the use of arsenic. The true nature of the entire group of diseases classed as sarcomatous is so little understood that it would not be surprising if certain cases, which clinically presented similar or identical features, should prove to originate from different causes and to be influenced by different therapeutic measures.

Generalized Sarcomata of the Skin resembling Mycosis Fungoides.—This type of the affection serves as a connecting link between mycosis fungoides and the variety just described. The examples so far observed have ocsurred in individuals from forty to sixty years of age. The first outbreak consists of one or more tumors on the face, extremities, or other parts of the body, followed within a few weeks or months by a more or less generalized eruption of dark-red or purple-colored nodules, from the size of a pea to that of an almond.

Tumors as large as a hen's egg may result from the fusion of a number of smaller ones. After a variable duration they ulcerate in a characteristic manner, producing a craterlike cavity beneath a central orifice, not unlike that in syphilitic gummata.

The ulceration may terminate by spontaneous cicatrization and break out afresh, while other tumors disappear without undergoing ulceration. The almost constant presence of ulceration in these tumors places them in strong contrast with multiple idiopathic pigmented sarcoma where it is of exceptional occurrence. The duration of the affection is short, death taking place within from six to eighteen months after its onset (Perrin). Funk states that in a case of his own, and in one of Bazin's, a recovery took place. Vidal and Brocq (La France Méd., tome ii, 1885) first definitely separated these cases from typical mycosis fungoides, giving the affection in this form the name *mycosis fungoides d'emblée.*

Perrin (De la Sarcomatose cutanée, Paris, 1886) prefers to classify these tumors as a *generalized primitive pseudo-mycosic sarcomatosis of the skin;* while Funk, in his clinical studies on sarcoma of the skin (*loc. cit.*), designated the group in question as *multiple idiopathic gummatoid sarcomata of the skin.*

Generalized Cutaneous and Subcutaneous Tumors in Leucæmia and Pseudo-leucæmia.—A number of cases are on record in which changes in and under the skin, together with tumor formation, have been met with, preceding and accompanying true and false leucæmia. Mycosis fungoides has also been seen in the same connection. The differences between leucæmia and pseudo-leucæmia are not so sharply drawn as formerly, for, besides the similarity of the new growths met with in both processes, the transition of one affection into the other has been more than once observed. With our present knowledge, it is not possible to definitely classify these various conditions, either from a clinical or anatomico-pathological standpoint.

Leucæmia Cutis.—Biesiadecki (Med. Jahrb., Vienna, 1876) met with small, pale-red, cutaneous nodules which appeared after leucæmic changes had taken place in the blood and the viscera.

In Kaposi's classical case of lymphodermia perniciosa (ibid., 1885) the alterations in the skin were primary, and consisted of localized and diffused patches of scaling, moist, and itching eczemalike lesions, followed by a doughy swelling and thickening of the implicated regions. Subsequently cutaneous and subcutaneous tumors developed, which were succeeded by enlargement of the lymph glands and spleen, by an absolute increase in the number of white blood-corpuscles, and death.

Hochsinger and Schiff's case (Vierteljahr. für Dermat. und Syph., p. 779, 1887) was unique in affecting a child aged eight months. In this instance the tumors were from the head of a pin to a hazelnut in size, freely movable with the skin, and disseminated over the entire body. The general disease was also present and the termination fatal.

Besnier observed a man aged sixty-six in whom a universal dermatitis with thickened skin, pruritus, alopecia, infiltrated patches and tumors, hypertrophy of the lymph glands, with a moderate degree of leucocytosis, was followed by the death of the patient within nine months, from an intractable diarrhœa. Besnier agrees with Kaposi in recognizing in his combination of symptoms a distinct clinical type.

Vidal, however, after observing a similar case in which death took place from pneumonia, believed it to be an early stage of mycosis fungoides before the development of tumors.

Paltauf (The Lymphatic Affections of the Skin, Second International Dermatological Congress, Vienna) is inclined to look upon Kaposi's lymphodermia perniciosa as more closely allied to mycosis fungoides than to leucæmia cutis, although believing them both to have a similar origin in the lymphatic tissue of the skin.

At the same congress Riehl described the case of a woman who developed in the course of a typical leucæmia a universal redness and localized thickening of the integument, which he showed microscopically to be of the same nature as the leucæmic changes in the viscera.

In the case reported by Neuberger (Verhand. der Deutsch. Dermatolog. Gesellschaft, Zweiter und Dritter Congress, 1892), two symmetrically situated leucæmic tumors were found upon the cheeks without other skin lesions. Funk (*loc. cit.*) has also cited other observations showing the coincidence of the skin lesions with the general process, so that it is well established that both a diffused and circumscribed new growth (tumor formation) may result from the peculiar affection of the cutaneous lymphatic tissue.

Pseudoleucæmia Cutis.—Joseph (Deutsch. med. Woch., 1889, No. 24) has observed during the course of Hodgkin's disease a number of pea-sized cutaneous tumors with a prurigolike eruption over the body, attended with intense itching. The microscopic examination showed the pathological process to be a lymphoma starting in the region of the sweat glands and subcutaneous fat. The author refers to similar observations by Wagner, and Funk has collected a number of instances in which tumors resembling mycosis fungoides were met with in this disease. The observations made very recently by Arning, Touton, and Joseph (Verhand. der Deutsch. Dermat. Gesellschaft, Zweiter und Dritter Congress, 1892) show that in the course of pseudoleucæmia multiple cutaneous and subcutaneous tumors, from the size of a pea to that of a walnut may arise which have all the characteristics of the malignant process in the lymph glands and spleen. In Arning's case, in addition to the skin tumors, others were found in the mouth and imbedded in the muscles.

In color they vary from a waxy transparency to a dark red or blue; they may form adhesions to the skin and break down with a central slough or ulceration. The structure of the tumor is composed of small round cells of the size and appearance of white blood-corpuscles. In the early stage of their development they form round, nodular collections at the junction of the cutis and subcutaneous cellular tissue. Small, spindle-celled sarcomata and mixed types have also been noted in leucæmic subjects. In Touton's case a cure was obtained by arsenic, and in Arning's case a marked improvement from this drug was observed.

Nonpigmented Sarcoma Cutis.—Independent of leucæmia and pseudoleucæmia general sarcomatosis may be encountered, presenting at times almost identical features with the cases referred to under the last two headings.

The tumors may vary in number from a few scattered ones to several hundred, and may be seated either in or under the skin. The overlying integument may be elevated, glistening, dark blue in color, and covered by dilated capillaries, or scarcely changed. The dark-blue spot may first attract attention, and only by feeling it can the underlying growth be detected.

Large nodular masses with a central depression, having some resemblance to the tumors in mycosis fungoides, are at times formed by the confluence of several smaller ones.

The growths are often quite painful on moving the involved parts, or may only be sensitive when pressed upon; in other instances they are free from any sensibility. They are firm and elastic to the touch, and remain subcutaneous, adhere to the skin, ulcerate, or form a central slough. In two cases of this variety of generalized sarcomata Kaposi effected a cure with arsenic. In neither of the patients could any evidence of change in the blood or lymph organs be detected.

Histologically they are round, or mixed round and spindle-celled sarcomata, closely resembling in certain instances the leucæmic tumors previously referred to.

In the cases which appear to be primary in the skin the original tumor can readily be overlooked, so that certain cases reported as idiopathic or primary may have been secondary to a malignant lymphoma or sarcoma of some distant organ.

Sarcomata of the skin may be secondary to a primary visceral tumor. They have been observed by Köbner after sarcoma of the testicle, by Holden and Butlin after a primary tumor of the parotid, as a metastasis from sarcoma of the cellular tissue about the kidney, and from sarcoma of the rectum and anus.

In size they range from that of a small shot to tumors as large as a hen's egg. At first freely movable beneath the skin, they later form adhesions to it, but only in exceptional cases ulcerate. They are firm and resistent to the touch. The skin tumors result from the dissemination of the sarcomatous cells through the blood. Death takes place from the general disease within six months to two years after the tumors appear in the skin (Perrin).

Diagnosis.—Transition forms undoubtedly exist between mycosis fungoides, the lymphatic tumors of the skin, and the variety just mentioned, so that it may be difficult at times to say in what way the affection began. In mycosis fungoides the tumors originate in the more superficial layers of the skin, while in the other varieties the deeper portion of the cutis or subcutaneous connective tissue is first involved. The prognosis of this variety is also less grave than in mycosis fungoides, as shown by the curative effects of arsenic in Touton's and Kaposi's cases.

Treatment.—Arsenic may be administered by the stomach in gradually increasing doses of Fowler's solution, or the same preparation may be diluted with equal parts of water and administered hypodermically. Larger doses may be given and repeated every second day.

Localized Nonpigmented Sarcoma.—As a primary single tumor, sarcoma may follow an injury, a vascular or other nævus, occur at the site of an old skin lesion, wart, cicatrix, or develop on or beneath the previously normal skin. The growth may remain localized for some months, or even years, slowly enlarging and undergoing ulceration before disseminating itself over the body. Its color may differ little from the surrounding skin, or be somewhat darker. Generalization occurs either spontaneously, after surgical interference or other irritation, the secondary tumors being found in the skin, subcutaneous tissue, the viscera, and lymphatic glands. The original tumor may assume a great variety of forms, being met with as a cutaneous or subcutaneous growth of variable consistence and size—never, however, exceeding that of an orange (Perrin). It may be pedunculated, assume a mushroomlike form, uncapsulated, or first be met with as a diffuse infiltration.

Taylor relates a singular case in which a sarcoma that closely resembled a keloidal growth developed after the removal of a wart. A diagnosis of spindle-celled sarcoma was made by the microscope.

Cohn has reported the case of a woman in which old sebaceous cysts of the scalp became sarcomatous (alveolar).

As a rule, sarcomata are less hard than carcinomata, and at times may be soft, pulsatile, or even fluctuating, from the unusual development of vascular tissue.

Etiology.—In seven cases of localized sarcomata collected by Perrin six were in women. Sarcoma is said to begin at an earlier age than carcinoma, and may be congenital. There is great variability in the matter of both sex and age, so that no fixed rule can be established.

The clinical course of sarcoma corresponds in certain respects to other affections of known bacterial origin, and numerous attempts have been made to ascribe to it such an etiology. Up to the present time little success has been attained either in determining the presence of bacteria or protozoa in such growths.

Prognosis.—The primary localized sarcoma is perhaps the most benign of the entire group, a permanent cure not infrequently following extirpation or an attack of erysipelas. Incomplete surgical interference or the application of caustics only serves to hasten the dissemination of the disease.

Treatment.—Early and radical extirpation has cured the localized tumor and prevented metastasis.

The internal or hypodermic use of arsenic has been successful in curing one or more cases of idiopathic multiple pigmented sarcoma, several cases of pseudoleucæmia, and a number of cases of multiple nonpigmented sarcoma.

Mycosis fungoides has disappeared after erysipelas, as have several cases of single and multiple sarcomatous tumors.

Encouraged by the cure of sarcoma and carcinoma after the accidental occurrence of erysipelas, attempts have been made to attain the same result by inoculating pure cultures or the toxines of the streptococcus.

Coley (Am. Jour. Med. Sciences, May, 1893) has succeeded in several instances, in both of these malignant tumors, in greatly modifying the intensity of the process and in completely curing one case of sarcoma of the back and groin. Death has followed such inoculations, so that such a possibility should always be borne in mind. The use of the filtered soluble products of pure cultures (toxines) is probably less dangerous.

In the treatment of sarcomatous ulceration an ointment of iodoform, aristol, or ichthyol, will often accomplish good results.

MYCOSIS FUNGOIDES. (Henry William Blanc.)

Derivative, μύκης, a mushroom.

Synonyms: Inflammatory Fungoid Neoplasm (Geber, Duhring); Fibroma Fungoides (Tilbury Fox); Ulcerative Scrofuloderma (Van Harlingen); Eczema Hypertrophicum or Tuberosum (Wilson); Sarcomatosis Generalis, Lymphodermia Perniciosa (Kaposi); Myeloma Cutis (Hyde); Granuloma Fungoides (Auspitz, Neisser, Rindfleisch); Lymphadémie cutanée (Ranvier, Gillot, Demange).

Definition.—A chronic, probably infectious, disease of the skin, with or without primary stages of urticarial, eczematoid, or lichenoid eruption, characterized by the formation of red or purplish fungoid tumors, a proportion of which tend, in the course of the disease, to undergo resolution without leaving a scar.

History.—This disease was first described by Alibert, who gave a representation of it in his great atlas in 1833. Since then cases have been reported by French, German, English, and American writers, under a variety of titles. It has been studied in America by Duhring (Archiv. of Dermat., January, 1879, and January, 1880), Piffard (Trans. Am. Derm. Assoc., 1878), Wigglesworth, Tilden (Boston Med. and Surg. Journ., October 22, 1885), Hyde (A Practical Treatise on Diseases of the Skin, 1883), Blanc (Jour. Cutan. and Gen.-Urin. Dis., July and August, 1888, and December, 1889), and Stelwagon (Jour. Cutan. and Gen.-Urin. Dis., January, 1892).

Symptomatology.—For the purpose of study, it will be convenient to recognize three stages of the disease, which appear in the following order: 1, eczematoid; 2, lichenoid; and 3, fungoid.

Reddish, circumscribed, slightly scaly patches of eruption, varying in size from that of a finger nail to that of the palm of the hand, appear upon any portion of the integument, and cause uneasiness by their intense itching.* They have been called by Bazin *plaques congestives.* Occasionally these patches are preceded for weeks by a sense of heat and intense itching *sine eruptione*, which provokes scratching and a consequent flushing of the skin. The scratching excited by paroxysms of itching is oftentimes very severe, the patient tearing the skin and causing the blood to flow. Usually the first symptom is a simple erythema, or urticaria, remaining for hours or days, and then passing entirely away.

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* Kaposi describes a form of this disease which does not itch. It begins as an erythema, or as red, firm lesions, resembling urticaria.

Eczematoid Stage.—During a period of time varying from a few weeks to several years the cutaneous lesions take a variety of shapes. What was first a red *plaque* increases into a diffused eruption resembling eczema, only without watery discharge; or the red *plaque* may thicken, and, because of increased scaliness, take on the appearance of psoriasis. No regular arrangement of the lesions, which are quite well defined, is recognizable. When the patches have not coalesced they are more or less circular, and are occasionally annulate.

The vasomotor disturbances in this stage may continue with less intensity throughout the course of the disease, sometimes appearing upon the face, for weeks at a time, as a local, diffused hyperæmia of the skin, sometimes upon the body and extremities as a general erythematous rash, not unlike that observed in scarlatina. Hallopeau and Jeanselme (Bull. de la Soc. Française de Dermat. et de Syph., No. 10, December, 1891, p. 436) have reported a case of mycosis, with scarlatiniform eruption, accompanied by pruritus and elevated temperature, and from which the epidermis desquamated in large, broad flakes, suggesting the disease described as *relapsing scarlatiniform erythema.*

The *lichenoid stage* appears as a natural result of that which precedes it. On the eczematoid or psoriasiform patches, and even on the formerly healthy skin, appear hard, pea-sized papules, which remain a varying period, disappearing as new ones form. These at first resemble the papules of prurigo, but later become larger and more nodular and well defined, and have a glistening appearance. They may be grasped between the fingers and are quite movable, and are sometimes the color of normal skin, but more usually rose-colored or bluish-red. During this stage the integument in the region of the eruption becomes harsh to the touch, thickened and scaly, while the hair on the different regions of the body may be thinned by constant rubbing. The extent of these symptoms depends somewhat upon the length of the stage of the disease, which varies from three months to two years.

The *fungoid* or tumor stage usually follows more or less abruptly upon the lichenoid, but in exceptional cases the disease may begin in this stage without having been preceded by any cutaneous manifestation whatever. This is the form that Bazin has described as *mycosis d'emblée.* Kaposi states that when the disease begins without the prefungoidal stage the tumors are confined to one region of the body.

In the development of the third stage the tubercular nodes of the second suddenly increase in size and become softer and more doughlike to the feel. The color deepens to a purplish hue, and the covering membrane loses all resemblance to the common integument. The size of the tumors is from that of a pea to that of the fist, though at times they spread out in flattened masses over a much larger surface. They may be sessile or pedunculated. When sessile they appear as solid, single tumors, or as a number of fungating masses, which, because of a central depression, present the appearance of an irregularly annulate lesion. The diameter of these circular masses is from three to eight inches, and they increase by peripheral extension in all directions, though Neisser (Verhandl. der Deutsch. Dermatolog. Gesellschaft, 1889, p. 289) has observed a case which spread serpiginously. Where these rounded fungoid tumors are grouped together, discharging a seropurulent liquid, they resemble less the *tomato*, to which Alibert likened them, than a mass of hæmorrhoids, to which the resemblance is striking. When nonsessile, they are thin and elongated, and attached by a pedicle which issues from a cuplike depression in the skin.

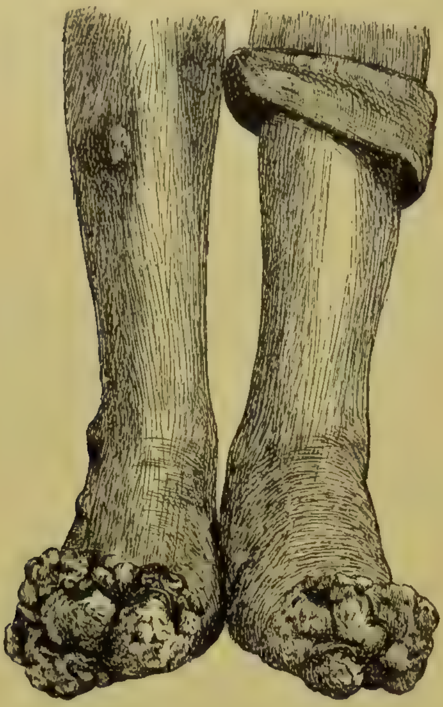
FIG. 75.—Mycosis fungoides.

Just as it is possible for the disease to begin by the formation of fungoid tumors without any previous eruption, so new tumors constantly appear in the third stage bearing no relation to an earlier eruption, and upon hitherto perfectly healthy skin. When a tumor has attained its full growth it remains so but a short time before a process of interstitial absorption takes place, the mass gradually diminishing in size, and finally disappearing altogether, leaving at first a pigmented spot upon the skin, and then a pinkish coloration, but no scar.

Sometimes the evolution of a tumor is exceedingly rapid—a growth attaining the size of a goose's egg, and then disappearing, all in the course of two weeks. Other tumors may remain throughout the disease, changing only in size and shape. Kaposi has shown that in that form of the disease which has no prefungoid eruptive stage the tumors never disappear, even temporarily, and are confined to one region of the body. The larger growths commonly discharge a watery, ichorous fluid, of sickening odor, and when irritated by the friction of garments or bedclothes, or when crowded together, they ulcerate and discharge pus and blood. No portion of the integument is free from the disease, which likewise invades the mucous membrane. In a case under the care of the writer there was a tumor in the vault of the palate and a growth inside of the urethra.

Itching, which is a marked symptom at the beginning of the disease, is present throughout, often coming on in violent paroxysms during which the patient is almost beside himself, and it is not uncommon to find, toward the termination of the disease, that a man has rubbed his scalp and chin until they are completely devoid of hair. Enlargement and induration of the lymphatic glands is marked, so much so that glands that are altogether unfamiliar to the surgeon, except in dissection, are easily detected by the sense of touch, and often by the sense of sight. They give no pain.

Œdema of the extremities, which sometimes comes early in the disease, is a common symptom after the stage of tumors is well established. The head and neck may likewise become the seat of this process. This, together with an amount of thickening of the skin over the entire surface, produces a sense of hardness not unlike that observed in scleroderma, but the induration is not permanent, as the œdema may pass off and reappear in the course of a few days. The skin of the hands becomes rough and hard, and the palms take on a psoriatic appearance. Sometimes at the beginning of the disease, sometimes not until the third stage is reached, a generally diffused pigmentation of the skin becomes a marked symptom, until finally the whole surface is darkened; the discoloration being more marked, however, about the seat of former lesions. The displacement of pigment occasionally shows itself in the formation of isolated leucodermic spots.

Prolonged paroxysms of itching, insomnia, and the constant drain upon the system by the discharging tumors, serve to put the patient's nervous system into an exceedingly unstable and hysterical condition, and nervous chills are not infrequently experienced at the anticipation of pain, as from the removal of a small tumor, or some more trifling cause. The appetite fails, and the patient weakens from insomnia because of pain and itching. An uncontrollable diarrhœa sets in, and the patient finally succumbs from general marasmus or some pulmonary complication.

Pathology and Morbid Anatomy.—The tumors are found only in the skin and those portions of the mucous membrane contiguous to normal apertures, as, for instance, the hard palate and meatus urinarius. When the disease is far advanced a round-celled infiltration in the mucous membrane of the intestines, the suprarenal capsules, and other viscera, has been noted. Pathologists are more in accord as to the appearance of the morbid anatomy of this disease than as to its interpretation; different observers pronouncing specimens to be a lymphadenoma, a round-celled sarcoma, or a granuloma.

Ranvier, noticing a scanty, delicate reticulum inclosing a number of closely packed lymphoid cells, pronounced it a lymphadenoma, and in this has been followed by a number of French writers. The strong resemblance of the tumors to lympho-sarcoma and round-celled sarcoma has been noted by certain German observers who regard mycosis fungoides as a variety of sarcoma, a disease which the affection undoubtedly very closely resembles in both its macroscopical and microscopical appearances. One of the earliest pathological changes observed in the skin is the appearance of great numbers of small, round cells, with turgescence of the capillaries and diapedesis of the red blood-corpuscles. A characteristic feature is the crowding together of lymphoid cells around the blood-vessels.

Under the microscope the disease consists of dense masses of cells; round, oval, or spindle-shaped cells in a fine, embryonic connective-tissue stroma, replacing normal tissue. This stroma is most easily detected in the younger and smaller tumors, the older ones frequently losing the delicate network appearance. H. D. Schmidt (Jour. Cutan. and Gen.-Urin. Dis., July and August, 1888) describes, in addition to the fine network alluded to, a lymphoid network of coarse connective-tissue fibers with small, single nuclei, representing the remains of the nuclei of multipolar cells, the whole protoplasm of which has been used up in the formation of the fibers of this coarse reticulum. Hochsinger, Schiff, Payne, and others regard the disease as a granuloma, and with them Crocker (Diseases of the Skin, Am. edit., 1888), who has seen a number of cases, is inclined to agree.

Etiology.—The disease is uncommon, and very little is known of the causes producing it. It is an affection of adult life, commonly beginning after the age of thirty, though Landouzy reports an exceptional case in a child seven months old. There is no reason to think that one sex is more liable to it than the other. Patients with this affection, as a rule, give no history of any family disease. In the service of Dr. Fox, at the New York Skin and Cancer Hospital, there was a female patient suffering with the disease, whom the writer had under daily observation. She had given birth to a child after having suffered from *mycosis fungoides* for two years and three months. The child was subject to some sort of eruption, it was reported, and died of hydrocephalus at the age of nine months. The disease, as far as is known, is not contagious.

Those who argue for its parasitic nature direct attention to the circular patches spreading peripherally, as in ringworm, for example. The answer to this is, that there have been a number of cases in which the lesions did not assume the annulate configuration, though the disease was otherwise quite marked. In a case reported by the writer there was a slight diminution of the number of red blood-corpuscles, and a marked increase of white cells, their proportion to the red being 1 to 130, instead of the normal 1 to 350 or 1 to 500. That is a proportion of three times as many white cells as are found in normal, *healthy* blood.

Diagnosis.—In the early stages of the malady a diagnosis is exceedingly difficult, inasmuch as the cutaneous manifestations simulate a number of other diseases of the skin. The red patches are to be differentiated from erythematous lupus, psoriasis, and eczema.

Unlike the disease in question, *erythematous lupus* appears most frequently upon the face, and there alone, while its larger patches present depressed centers of atrophied tissue. Itching, which is a prominent symptom in mycosis fungoides, is very slight in erythematous lupus. Certain forms of mycosis fungoides can only be differentiated from *psoriasis* by the tendency of the latter to seek the extensor surfaces.

Eczema is very closely imitated by mycosis fungoides, and indeed the appearance of some of its early lesions is identical with this disease, but the circumscribed nature of the patches of mycosis fungoides, their chronicity, and their very slight tendency to discharge, will generally serve to procure a proper differentiation. A series of different eruptions accompanied by pruritus and general hyperæmia, together with a tendency toward the formation of circumscribed, indurated patches, with possibly a general enlargement of the lymphatic glands, are symptoms that should tend to make us suspicious of a case of mycosis fungoides.

The lesions of the *lichenoid* stage very clearly resemble the disease from which it gets its name, and the chief difference is that in true *lichen* the papules are smaller, attaining a certain size and remaining so, and there is no concomitant thickening and pigmentation of the skin. The papules of lichen are not preceded by any erythrodermatous lesions, but remain such throughout the course of the disease.

The third and most characteristic stage of the disease, the *fungoid*, may be mistaken for leprosy, multiple sarcomata of the skin, and perhaps syphilitic gummata.

The resemblance to *leprosy* is most marked when the lesions of mycosis are in the face, but the constant pruritus of mycosis and its dough-like, fungating, discharging tumors are never seen in leprosy. In the latter disease there is a more marked and extensive anæsthesia of the skin, its ulcerations are deeper, and leave permanent scars. The *bacillus leprae* in the tubercles of the disease is easily detected under the microscope, and its presence will of course set aside all doubts as to diagnosis.

The strong resemblance that the disease under consideration bears to *multiple sarcomata* of the skin, both in macroscopical and microscopical appearance, and the doubts of certain dermatologists as to their being separate diseases, make the task of differential diagnosis all the more difficult. The difficulty, however, lies only with that variety of the disease in which the tumors beginning in the integument spread generally over its surface—viz., idiopathic *multiple pigmented sarcoma*. As a matter of difference, then, it should be remembered that sarcomatous tumors are not preceded by eczematoid and lichenoid eruptions; that itching is a symptom in a minimum of cases; that, though the tumors are often pigmented, the skin remains unchanged; that, though old tumors may disappear as new ones arise, they go away by ulceration and not by resolution; that the evolution of the sarcomatous tumors is far less rapid than that of mycosis, which grows even faster than the carcinomata. An appeal to the microscope will disclose, in a recent growth, a fine, reticulated structure surrounding the cells.

Syphilitic gummata are to be differentiated from mycosis by a tendency to be local rather than general, and the character of the tumors themselves, which never stand out so prominently upon the surface nor become pedunculated, nor present the hæmorrhoidal appearance of the fungoid mycosis. In case of doubt, the therapeutic test should be applied, and a failure to resolve under potassium iodide will serve to exclude syphilis from the diagnosis. The presence of itching would exclude syphilis from the diagnosis, but its absence is only a negative symptom, as the form of mycosis which most resembles syphilis frequently does not itch.

Prognosis.—Mycosis is a chronic disease, with an average duration of three to eight years. Patients improve from time to time, partly as a result of treatment, partly because it is the nature of the disease for symptoms to temporarily ameliorate, but it usually terminates fatally. The signs of an approaching fatal issue are persistent diarrhœa, together with its consequent marasmus. When these conditions are marked and the tumors continue to discharge and ulcerate, the patient's health declines rapidly.

Bazin and others have reported cases in which all symptoms have disappeared, but the test of time is required to prove whether or not these were permanent cures. The form of the disease in which the tumors are localized, and where they are not preceded by other eruptive stages, is more rapidly fatal, the patient dying within two years—sometimes in less than three months. A case of Gaillard's proved fatal in nine weeks, and one of Hardaway's (the nature of which is somewhat uncertain) was still living after having had the disease for twenty-one years.

Treatment.—Mercury, potassium iodide, chaulmoogra oil, and a host of other agents, have been tried in this disease, with the sole result of disordering the stomach. Thus far but one agent has been found to be of service—arsenic. Fowler's solution may be administered by the mouth, in three to ten drop doses, three times a day, or, once a day, hypodermatically, mixed with an equal quantity of distilled water. When used subcutaneously it is injected under the skin of the loins or posterior thoracic region, the dose of the mixture being six drops to start with and gradually increased. Great care and cleanliness should be observed in the hypodermatic injections, in order to prevent abscesses, which sometimes form despite all precautions when arsenic is injected.

The general health should be maintained by appropriate tonics, and more particularly those that are prepared in forms most easily absorbed. Anything that tends to upset the stomach or loosen the bowels should be avoided, for it is in the digestive apparatus that the patient usually breaks down. This applies to food as well as to medicine.

As antipruritics, cinchonine, quinine, and antipyrine have been tried and found of great value. It is better to depend upon these agents, especially the first two, than to use carbolic-acid lotions upon the surface, which, to be effective, must be dangerously strong.

Dressings for the tumors, which are dry and in powder form, have given the best results. In the writer's experience, such sticky substances as balsam of Peru, ichthyol, and the like, only serve to make the tumors more tender and painful, and do no permanent good. Any one of the following powders may be sprinkled thickly on the discharging surfaces after washing them with a permanganate of potassium solution: Iodol, bismuth, aristol, hydronaphthol, dermatol, iodoform. Vidal and Simon recommend ointments of pyrogallic acid for local treatment. This may be prepared in the proportion of ten or fifteen per cent, with ointment of oxide of zinc. A powder of boracic acid and starch, in the proportion of one to five, may be sprinkled upon the tumors.

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FRAMBŒSIA. (Isadore Dyer.)

Derivative: Fr., Framboise, a raspberry.

Synonyms: Yaws; Fr., Pian; Polypapilloma Tropicum; Ger., Beerschwamm; Tonga; Amboyna Button; Bubas; Paranghi; Patlek; Nambi, etc.

Definition.—Frambœsia, or yaws, is an endemic disease of the tropics, with prodromes usually present, but at times insignificant or entirely absent. The disease is characterized by an eruption with several stages, developing finally into a fungoid type, which has suggested its name.

It is generally believed that frambœsia had its origin on the west coast of Africa. From there it has spread to various parts of the globe. The disease was unknown to Europeans until slavery was introduced into the colonies. Ali Abbas, writing in the tenth century, describes a contagious disease answering to the description of frambœsia, which he found in Ethiopia and India (Sprengel, Beiträge, etc., p. 95).

According to Crocker, Oviedo was the first to mention the yaws disease. He discovered it in Santo Domingo in 1535.

Pison, of Leyden, reported the first case from Brazil in 1648. He stated that it was an endemic disease, attacking all classes of individuals, and was known to the natives as *bubas* (G. Pisonis, M. D., Lugd. Batav., De Medicina Brasiliensis, 1648, lib. ii, cap. xix, fol. 35). In 1718 Bontius described the same disease in Amboyna and in the Moluccas. He called it the *Amboyna button* (J. Bontius, Med. Indorum, Ludg. Batav., 178, trans. and cited by J. Rollet). Winterbottom and Schilling observed the disease in Africa and in the Antilles; recognized it as endemic and contagious. With Hillary, who wrote about the same time (1759), they called the disease *yaws* (Acc. of the Native Africans in Sierra Leone, vol. ii; De Morbo Pene Ignoto quem Americani Vocant Yaws, 1770; Observations on the Change of Air and Concomitant Epidemical Diseases in the Island of Barbadoes). More recently the disease has been better studied and described. Nicholls, Gavin Milroy, Imray, Bowerbank, of the West Indies; Kynsey, of Ceylon, Charlouis, Gewand, Van Leent, etc., are among the most modern of the students of this subject.

In 1832 Alibert made frambœsia a variety of mycosis, and called the condition *mycosis frambœsioides*. Under the class *mycosis syphiloides*, he placed those isolated endemic varieties of syphilis with which frambœsia for a long time was classed, viz., the *scherlievo*, the *falcadine*, *sibbens* of Scotland, *radesyge* of Norway, etc. Frambœsia has been localized in tropical countries, especially the west coast of Africa, Madagascar, Ceylon, Hindostan, Oceanica, East and West Indies (Dominica and Jamaica particularly), South America, Central America, and Mexico.

Frambœsia is a disease distinctly *sui generis*, with its different stages of evolution and retrogression. Its identity with syphilis has always been in dispute. Bazin was the first to describe the disease as distinct. Alibert was one of the strongest advocates of its relationship to syphilis. The existence of modified syphilis in many parts of the world, at first isolated as new forms of disease, probably led to the inclusion of this disease in the same category. Frambœsia has many points in common with syphilis. Syphilis is multiform in its eruptions, while frambœsia has always the same stages of development. The two diseases are found side by side (Gewand), and the lesions of frambœsia are autoinoculable.

Symptomatology.—Numa Rat, Gewand, Van Leent, and others agree in recognizing four distinct stages of the disease: 1. Period of incubation, prodromic, from eight to twelve days; 2. Period of eruption, primary eruption completed in from twelve to sixteen days; 3. Period of secondary eruption, acme of development of the tubercles, ulceration, etc., four to eight weeks after infection, ten to forty days after primary eruption ; 4. Stage of retrogression or healing, desiccation eight weeks to eight months after the primary eruption.

The period of incubation is marked with prodromic symptoms more or less severe. These are especially anorexia, insomnia, articular pains, pains on arms and legs, loins and back, slight fever, hyperidrosis, general *malaise*, etc. The skin gets pallid, loses its tone, becomes scaly, and itches slightly. In children the prodromes are more marked than in adults ; in fact, the prodromes are often entirely absent in adults. Thomson compares the scaling of this stage to a "skin dusted with flour." Before the desquamation is quite finished there appears, eight to twelve days after infection, either a single or multiple lesions. Some authors speak of a slightly elevated papular erythematous eruption succeeding the desquamation, from which, in turn, the true papular eruption of the disease takes its origin. Charlouis denies this, and describes the first eruption as distinctly papular. The eruption is gradual, in the form of small, pin-head-sized papules on various parts of the body. These soon take on a yellow point at the apex, and shortly are surrounded with a dark area, red in persons of a lighter skin. Marked papules appear generally, and shortly the whole body is involved, not excepting the scalp. Gewand lays stress on the fact that the multiple eruption follows the course of the lymph channels rather than the nerves.

The glands now become swollen, and at times are painful. The papules begin to increase in size, more markedly in breadth. Their tops become covered with yellow crusts, usually pointed red. The crusted papules soon develop into tubercles, the crust falls away and exposes a true papillary growth, discharging a foul-smelling, sticky fluid of a dark-yellow color. This growth has been variously compared to a raspberry (*framboise, yaw, pian*), mulberry, or strawberry ; Charlouis compares it to a champagne cork, larger at the top than at the bottom, hard, and movable with the skin. Imray (quoted in T. Fox, Dis. of the Skin, 1887, p. 97) believes the comparison to a raspberry hardly true. He says : "The ordinary yaw excrescence is not unlike a piece of coarse cotton wick a quarter of an inch more or less in diameter, dipped in a dirty-yellow fluid, and stuck on the skin in a dirty, scabby, brownish setting, projecting to a greater or less extent. It is true there are sometimes red spots or streaks on the yellowish surface of the yaws fungus, but this appearance, instead of being general, I have found only exceptional."

The tubercles may become confluent in forming one large lesion. When the tubercle has reached its acme of development it begins to decrease in size ; the color grows darker, the crusts fall off, and the surface becomes dry. Furfuraceous scales form, sticking closely to the tubercle.

The lesion grows gradually darker, while the area around grows lighter and clearer. Finally, after weeks or months, the tubercle has disappeared, leaving behind only a dark spot with a sharply defined scar. The skin finally becomes normal. Such is the usual course of a case without complications.

There are some unusual varieties of frambœsia which need to be mentioned. It is the popular belief that the disease begins with a primary yaw or parent yaw (*maman pian*), from which the other lesions multiply. The tubercle which bears this name is usually very much larger than the ordinary yaws, and is often surrounded with a number of smaller lesions. This readily gives color to the popular designation. Watery yaw, or *pian gentelle*, is the name given to irregular lesions, which abort and form blebs. Coalescing lesions, which form a ring around the mucous orifices, as the eyes, nose or mouth, or anus, and are covered with one crust, are called "ringworm yaws" (Crocker).

Tubboes is the name given to the lesions attacking the feet. Sometimes, especially among the laboring class, the disease attacks the palms and soles, the yaws forming in the fissures common in those locations. Such sores naturally spread along the lines of least resistance. Obstinate protruding ulcers are formed, painful to a great degree, and resembling the outlines of a crab, from which they are called "crab yaws" by the natives. This is really a secondary condition. Some authors hold that the crab yaw is capable of reproducing itself when inoculated upon another subject. It is most likely inoculable as other yaws lesions, or, when it has remained long after the disease is cured elsewhere, it may produce another ulcer like itself, but simply from the pus infection.

The mucous membranes are at times affected, and the deeper tissues of the skin, giving rise to ulcers often obstinate and hard to cure. Caries may be present. The joints are affected occasionally, and deformities may result. All these conditions are not essential to the disease, and are the result, as a rule, of neglected treatment, or the occurrence of yaws in an individual of depraved health in other respects.

Frambœsia has its sites of predilection. These are the muco-cutaneous junctures—eyes, mouth, nose, ears, chin, anus, prepuce, lips of the vulva, perinæum, flexor surfaces, palms, and soles, and parts of the body liable to injury.

Etiology.—Frambœsia is a contagious disease. It is contracted by inoculation with a specific virus at some point of the skin where there is an abrasion. Lacaze and Bowerbank suggest the parasitic nature of the contagion.

Dr. H. A. A. Nicholls, of Dominica, claims to have found the germ responsible for the contagion. In a letter to Dr. W. H. Blanc, of Sewanee, Tenn., he says, "I have been fortunate enough to work out the pathology of the disease, which is due to a micrococcus from 0·5 μ to 1 μ in diameter, the irritation of which gives rise to granulation tumors characteristic of the malady." Among the contributing causes may be noted especially diet, hygiene, childhood, climate, race (natives are more liable to attack on account of exposure to contagion), malnutrition, or previous bad health, etc.

Pathological Anatomy.—The seat of the pathological process is in the cutaneous tissue, beneath the epidermis, at the border of the pars papillaris. It is only in a very advanced stage of the disease that the deep cutaneous tissues are involved. The characteristic of the disease is the formation of neoplasms in the indicated part of the skin—neoplasms which have the qualities of tubercles (Van Leent). In the section they show a fatty consistency, a yellowish color; their tissue is filled with a rose-yellow liquid of nauseating odor. The skin around the tubercle is thickened, hard, and callous; the lymphatics are dilated, the lymph glands are swollen. In severe advanced cases they contain abscesses, and are themselves much degenerated, transformed into a grayish mass encysted in the cellular tissue. In the liver, spleen, kidneys, and lungs the tubercles are found accumulated and forming cheesy masses breaking up the organs. These pathological products are found as well in the muscles, the ligaments, the cartilages, and the bones. Secondary caries is caused in the same way by a pathological change in the exudate (Van Leent).

The first perceptible microscopic change which takes place after infection is an augmented cell formation in the papillary layer of the skin. The newly formed cells quickly become horny and cling to the epidermis. From these the white nodule of the first twelve days takes its origin. The deeper cells form granular masses beneath the epidermis, and the skin papillæ become flattened. The greater the heaping of cells in the stratum mucosum, just so much more elevated is the whitish epidermic point, until it falls away, and the characteristic frambœsic ulcer comes to light (E. H. Gewand, Ueber Polypapilloma Tropicum, 8vo, Freiburg im Breisgau, 1889).

The rete is much thickened. Granular cells are found especially in the larger tubercles. The papillæ are enlarged by swelling as well as by the accumulation of the fibrous tissue and the abundance of cells. They not only rise above the normal level of the skin, but penetrate deeply into the corium. The papillæ here not only spread perpendicularly, but may have an irregular course. At the juncture of the lesion and the sound skin they are not so prominent, becoming more normal here. Wherever the morbid process exists there are granular cells, and in advanced cases these cells accumulate and penetrate deeply, involving the lymph channels. The vascular tissue of the papillæ, as well as the subpapillary network, is considerably swollen and tortuous in form. This may be seen in the pinhead-sized fungous growths; the larger tumors show a proportionate dilatation of the deeper vessels. The expansion begins in the upper vessels, so these first change. A thickening of the corium takes place, especially in the pars papillaris.

The examination of the hair shows an accumulation of granular cells in and between the hair-sac layers, close to the capillary tissue. The sebaceous glands are somewhat enlarged and secrete much sebum. Granular cells also congregate around the glands in the connective tissue. The sweat glands appear as tubes half again or twice as wide as in their normal condition. The endothelium of the tubes is much larger than before. It appears, therefore, that the whole process in the skin has its origin in the surface of the pars papillaris and spreads down into the corium. They occur densest around the vessels, down into the corium even (Charlouis). There is first a dilatation and alteration in the course of the blood-vessels, a consequent egress of granular cells (really leucocytes), a proportionate enlargement of the papillæ of the skin, and a final implication of the hair-follicles, sebaceous and sweat glands, and the muscles of the skin. As the tubercle disappears, the upper layers of cells and the granular cells of the stratum mucosum desiccate, after which it looks as if the tubercle had been sprinkled with fine sand. The granular cells in the corium are either absorbed by the lymphatics, or, after degeneration, taken up by the blood-vessels themselves (ibid.).

The **prognosis** of the disease is favorable to a cure. There may be many recurrences, occurring in a few months or extending over many years. Complications modify the prognosis, as in other diseases. The disease may heal spontaneously in a few weeks or months. The least duration of each tumor (Brocq) is from one to three months.

Diagnosis.—The diseases of the skin from which frambœsia must be separated are few. Of these, syphilis is the one of most importance. Opposed to the characteristics exhibited by syphilis, frambœsia is a chronic disease often ending in death. It is marked by an eruption of distinct stages, beginning as a papule and ending in a fungoid ulcer, the whole process often complete in one to three months. There is no alopecia in frambœsia, excepting secondarily and the result of complication. Itching is common, and the adenitis is always secondary. The primary lesion of frambœsia is never indurated. Inoculation with the yaw virus gives a yaw, not a chancre. The lesions of yaws are auto-inoculable. The yaw lesions are confined to the skin and mucous membranes, and ulcerate only when complicated. Finally, syphilis and yaws are often found side by side in the same individual. The location of the lesions of scabies in the folds of the skin, and the presence of the parasite, exclude further comparison. The constitutional disturbances, the regular periodic changes in the eruption at almost fixed times, and the umbilication of the lesions, will differentiate variola. There remains to separate from frambœsia that epidemic infectious disease of the Peruvian Andes, *verrugas.* This is a febrile disease of irregular form, with a polyform eruption. It is characterized by muscular spasms and pains, stiffening of the joints, and marked anæmia. The disease is confined to the narrow valleys of the western Andes, in Peru. It attacks whites preferably, and is fatal in six to ten per cent of cases. It is believed, to be climatic rather than contagious.

Treatment.—In the treatment of yaws attention must be paid to the hygienic conditions of the patient. Frequent baths are indicated; proper ventilation and isolation are desirable. The diet should be wholesome and nutritious; well-cooked vegetables and fresh meat are the best class of foods to administer. In the prodromic stage little treatment is required beyond meeting the indications. Quinine is used to allay fever, and diaphoretics are given to promote the function of the skin. A host of remedies are suggested as useful and as specific in the various stages and conditions. Sarsaparilla and guaiac are given early in the disease. The following pill has been suggested (Horton): ℞ Ext. guaiaci, 1 grm.; ext. sarsaparillæ, 1 grm.; flor. sulphuris, 1 grm. M. et div. in pil. no. 6. Sig.: two pills night and morning.

Liquor Van Swieten is also recommended. Pure carbolic acid, iodoform, iodol, calcium sulphide, sodium sulphite, mineral acids, antimonials, Fowler's solution of arsenic, the citrate of iron, etc., are some of the treatments advised. The most satisfactory treatment seems to be based on the rigid attention to general indications and the internal administration of the iodide of potassium and alkalies. Mercury is recognized as useful in dispersing the eruptions, but does not seem to affect the constitutional symptoms. Brocq considers that mercury has given negative results.

The external treatment is the more important. The indication appears to be the removal of the lesions after they have developed. For this purpose various caustics are used. The sulphate of copper, in powder or solution, alone or combined with arsenious acid, is applied to the surface of the ulcer. Pure carbolic acid, the acid nitrate of mercury, the nitrate of silver—all are used for the same purpose. A rational treatment would be a regular course of antiseptic baths (bichloride of mercury or the sulphuret of potash baths are suggested), with daily attention to the ulcers. The actual cautery, followed by the application of stimulant antiseptic dressings of bichloride-of-mercury solutions, iodoform powder, boric acid, iodol, aristol, etc. The caustic pastes are mentioned by some authors, but the usefulness of these would necessarily be limited to small areas.

Inoculation through one attack of the disease provides a certain future exemption, though an immunity is not always certain.

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VERRUGA. (Rudolph Matas.)

Derivative, Verruga, Span., wart.

Synonyms: Verruca Andicola (Lat., Salazar); Peruvian and Andean Warts; Verruga de Sangre (Span., Blood Warts); Verruga Blanda (Soft Warts); Verruga de Castilla (Castilian Warts); Verruga de Zapo ó de Quinua (Frog Warts); Verruga Mular (Mule Warts); Carrion's Disease (after Daniel E. Carrion); Oroya Fever.

Definition.—Verruga is a specific eruptive, usually febrile disease of an irregular type, which is peculiar to certain valleys in the Peruvian Andes, in which it prevails endemically. It is transmissible by inoculation, and is characterized by a profound anæmia, by muscular pains and cramps, by pains in the joints and bones, and especially by an eruption which, when typically evolved, consists of multiple and exuberant granulomatous formations which suggest the appearance of warts. It has a cyclical evolution of long duration that is not influenced by treatment, and is liable to many complications.

Geographical Distribution.—"The disease prevails almost exclusively on the Pacific slope of the Peruvian Andes, and outside of this limited area all cases of this disease are imported. Even in this well-defined territory there are only certain localities in which the disease is indigenous and endemic. Conspicuous among these is the village of Santa Ulaya, situated at a height of seventeen hundred metres, in the valley of Santa Ulaya (province of Huararichi), which is supposed to be the original cradle of the disease; the village of Matucana, about two thousand metres above the sea, in the valley of Cocachacra; the valleys which are situated at the foot of the Cerro de Pasco, where there is a large mining population; the province of Chiquiang; and several valleys to the south of Lima. As a rule, the valleys in which this geographically remarkable disease prevails vary from seven hundred to twenty-six hundred metres above the level of the sea" (Dounon).

History.—Verruga has evidently existed in Peru from the remotest period in its history. It is first mentioned by Agustin Zarate, in 1543, in his History of Peru, in which he says: "The climate is very warm and unhealthy. There is in particular a well-marked disease characterized by warts which appear on the face and other parts of the body. They have deep roots, and are very much like boils." The same writer makes note that Pizarro's army was attacked by this disease. It was prevalent during the time of the Incas and Spanish conquerors, as is witnessed by several historians. Gomarra, writing of the Spaniards of that time, says: ". . . Hardly had they satisfied their fatigue and hunger when they were attacked by a new and ugly disease, which they called *verrugas*. From the pain they caused they were like boils. These warts or pustules came out on the eyelids, nose, and ears, and other parts of the body, as large as nuts, and bloody" (Historia de las Indias, tomo ii, p. 103).

Garcilaso de la Vega writes: "There appeared among the followers of Pizarro an abominable disease, which began on the head and face; warts appeared, which grew as large as a black fig, and which were suspended by a small part, and they bled profusely, causing much pain and fear. It was impossible to touch them, and they caused an ugly appearance to those that were afflicted, because in some they came out on the forehead, in others on the eyelids, and others in the point of the nose, on the chin, and in the ears, and they did not know what to do. Many died, but some recovered. It was not limited to the Spaniards, but is common throughout Peru" (Historia General del Perú, libro i, cap. xv, p. 11, Córdova, 1617).

Other early writers confirm these statements. A glance at the bibliography reveals that the first serious medical study of the disease was published by Tschudi, in 1845. He was followed by Smith, Oriosola, Salazar, Velez, and others, whose contributions to the literature of the subject have been recorded in alphabetical order in the index.

Symptomatology.—The typical evolution of this disease is accomplished in three periods: 1, incubation; 2, invasion; 3, eruption; 4, desiccation, retrocession or mortification, according to the manner in which the eruption terminates.

Incubation.—The majority of observers agree that this may vary from eight to forty days; others from three weeks to one year. Daniel E. Carrion, the lamented Peruvian student, who had himself inoculated (1885) with verrugas for the purpose of testing some of the controverted issues in the history of this disease, began to notice the first symptoms twenty-two days after his inoculation.

Invasion.—This period may be subdivided into a *prodromic stage* and the period of invasion proper. A feeling of *malaise*, lassitude, depression, and the usual signs of gastric disturbance, characterizes this stage. The invasion proper is generally gradual, and is marked by an increase of the symptoms already mentioned. Pain and fever are the most salient phenomena of this stage. The pains are the cause of the greatest complaint on the part of the patients. They are rheumatoid with nocturnal exacerbations; they are usually articular, and attack the joints one after another, commencing ordinarily in the knee; sometimes, however, in the smaller joints of the hands and fingers. Their intensity or extent are usually in proportion with the gravity of the disease, or are in relation with the degree of violence of the disease, to the length of time before the eruption appears, and the climate in which the patient happens to be when attacked, observing that in cold localities the pains are more severe. The pains in the muscles of the back are at times so severe as to produce rigidity, giving rise to torticollis or even opisthotonos, and contractions of the upper and lower extremities more or less prolonged. These pains and contractions often force the patients to assume unnatural positions, and to cry out loudly, with the intensity of their suffering. Each exacerbation provokes new and severe suffering.

Fever.—Accurate and complete thermometric tracings of verruga fever, from the very inception of the disease, are not easily secured, for the following reasons (Beaumanoir):

When patients suffering with verruga are first seen in Lima—which is the city nearest to the verruga foci of infection—several weeks have generally elapsed since the beginning of the disease; in the endemic foci of infection themselves the facilities for accurate observation are scant, and the records can at best be kept only irregularly; at other times, the nature of the disease not being suspected, the temperature is not carefully noted. It is only when the arthritic pains are added to the usually irregular fever of verruga that an appeal is made to the thermometer. A great variety of pyretic types are observed even when the disease is evolved without complications. In those cases in which the affection is heralded by an initial fever two types are presented—the acute rheumatic and the low typhoid (Ward).

In many cases the fever assumes an intermittent form; the paroxysms frequently begin at noon or two o'clock in the evening, and are initiated by a feeling of great prostration and chills of variable intensity; an elevation of temperature follows, which is accompanied by exasperating pains; this pyretic period continues until midnight, 2 A. M., or 4 A. M., and ends by a more or less abundant sweat, which coincides with a diminution or even entire disappearance of the pains. It is important to notice that the fever has all the characteristics of a hectic fever. The thermometer oscillates between 36° and 40° C. ($96\frac{4}{5}$° and 104° Fahr.); it rarely rises higher than 40° C. (104° Fahr.).

The intensity of the fever is an index to the intensity of the infection. When the fever is violent, as in the malignant types of the Oroya fever, the patient usually succumbs before the eruption has time to make its appearance. On the other hand, the apyretic cases are much more benign, unless complicated, though they are likely to drag along more slowly through the normal cycle of the disease.

Pulse.—When the temperature is high, the pulse is always very frequent. In many cases at the end of the period of invasion the pulse is small, soft, and compressible.

The *urine* is generally clear and acid, and leaves a sediment of urates on cooling. Twelve analyses gave the following results: Twelve times indican, and the quantity was in direct ratio with the gravity of the symptoms; four times glucose in marked quantity; twelve times ammonio-magnesian phosphates in the sediment formed shortly after emission (Flores).

Other Symptoms.—The skin assumes a pale, earthy tinge; the mucous membranes, especially labial and gingival, become as pale as wax. The heart-beats are feeble; soft, hæmic murmurs are heard. The general movements are languid, without energy or precision; locomotion is vacillating. Frequently serous effusions take place into the pericardium or pleuræ. The spleen is notably increased in size. It is hard, and can be well defined by palpation when there is no ascites. In some cases the liver is slightly enlarged. The anæmic state is accentuated as the disease progresses in its march, the patient finally presenting a typical cachectic appearance. In females there are frequent menstrual troubles.

Eruption.—From the date of the first symptoms, which are usually obscure and doubtful in character, to the day in which the eruption presents itself, a period of twenty days, or six or eight months, or even one year, may elapse, according to Flores.

The eruption begins first in the skin of the face and extremities, and then spreads gradually to the rest of the body and mucous membranes. It may be discrete or confluent. During this period the general symptoms improve considerably, especially if the eruption is complete and rapid. The anæmia alone persists, and may be even aggravated, if the verrugas ulcerate and bleed, which is not a rare event. The question has been asked, Is the eruption a constant and unfailing accompaniment of the verruga disease? It may be absent, and it is apparently wanting sometimes in some very abnormal cases; but when it does not appear, it is because the patient has succumbed during the invasion before the eruption has time to manifest itself, or there has been an error in the diagnosis. Apart from very exceptional circumstances the eruption is the rule, and just as necessary an accompaniment of the disease as the exanthem is an obligate phenomenon of the eruptive fevers proper. It is certainly the most characteristic symptom, and constitutes the only pathognomonic sign of the malady.

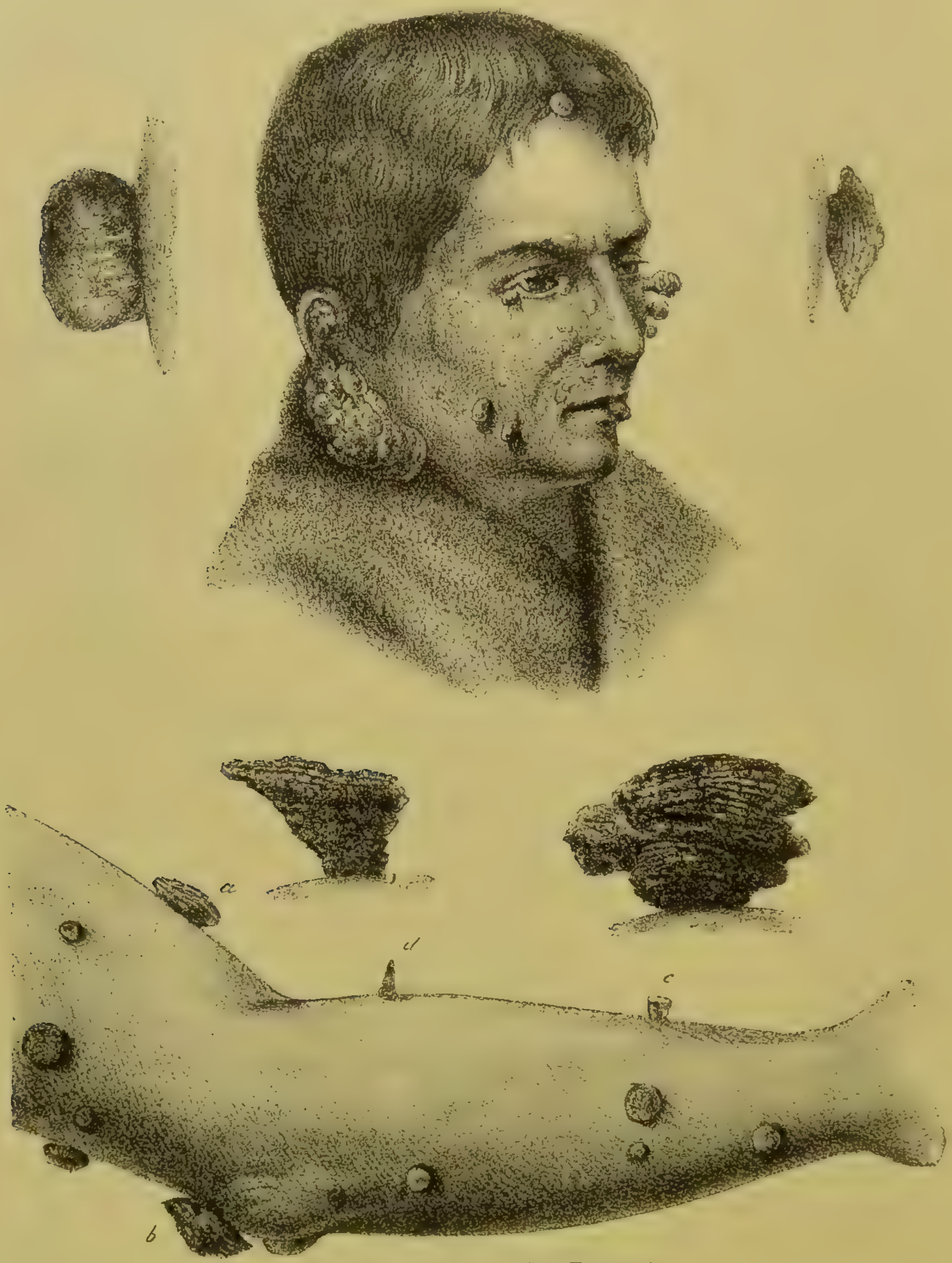

FIG. 76.—Verrugas (after Dounon).

The form, the evolution, and the distribution of the tumors are most variable. They make their appearance on the surface, in the thickness of the derma, and in the subcutaneous areolar tissue. They also appear on the buccal, labial, nasal, and oculo-palpebral mucous membranes; and also in the pharynx, nasal chambers, urethra, and vagina. The appearance of the warts in these localities constitutes the *external eruption.*

Sometimes the verrucæ appear in the splanchnic organs and in the serous membranes. This constitutes the *internal eruption*, and it may coincide with the external eruption. The warts are sometimes very small, and may disappear by desiccation or desquamation, without leaving a trace. At other times they grow to the size of an orange, or even larger; in their development they cause grave disorders of the organs or regions from which they spring; sloughing takes place, vast ulcers result, and copious hæmorrhages follow as a consequence. Tschudi determined by actual weight that the bleeding from a single growth amounted to fourteen hundred grammes! The cachectic state becomes so pronounced that death soon follows.

The eruption, instead of coming out as a whole, frequently appears in successive crops, so that sometimes one crop is on the eve of maturation and desiccation when a fresh one makes its appearance in some other part of the body.

In the beginning, when the eruption is about to make its appearance, the site of the future tumors is first indicated by small, reddish spots; or (and this is more frequent) small, clear vesicles, closely resembling sudamina, and accompanied by pruritus, precede the other phases of the eruption. Little by little these spots or vesicles are transformed into rose-colored papules, which increase slowly in volume and finally assume a red-scarlet hue. Some of these burst, more on account of the scratching caused by the itching sensation of the skin, rather than by the overdistention of the vesicles; bleeding is caused thereby, and dusky red, almost black, crusts of dried blood are formed, and after a few days these crusts fall and leave a true scar. The verrugas which have not been scratched continue their evolution and attain a variable size, assume a very marked red color, and are more often sessile than pedunculated. Heat and cold have a great influence on the growth and size of the tumors. Under the influence of heat they enlarge, become gorged with blood, and burst at the least contact. Cold, on the contrary, tends to diminish their growth and size and make them harder. Any prolonged muscular effort, such as straining at stool, will increase their size and deepen their color. They present, under these circumstances, the characteristics of cavernous angioma. Sometimes the patients complain of pains in the tumors, which they compare to the pricking of a pin.

These are the general characteristics of the tumors which are seen on the surface or in the thickness of the derma.

The *subcutaneous verrugas* can only be detected by the touch. If careful palpation is attempted in the area of election, small, round, movable tumors of the size of a pea can be felt rolling under the fingers. The overlying skin is not affected in the least, and the patients do not complain of any inconvenience. There is no associated lymphatic enlargement. These tumors may remain indolent and painless throughout the whole course of the illness, finally disappearing by absorption or atrophy. In other cases, especially if the eruption is confluent, the skin becomes tumefied; the tumors increase in size, the skin becomes distended, thin, inflamed, and adherent to the growth, causing great itching, and finally giving rise to distinct masses, which are detected by the most superficial examination. These tumors remain sometimes covered by the skin, which becomes dusky, violet-red, and almost blackish, and finally gives way and allows a small quantity of bloody, ichorous pus to escape. Sometimes the ulcerated skin will expose a little tumor, consisting of fleshy granulations or fungosities of a dirty grayish or black color, which exhale a disagreeable odor, owing to the sanious secretion which bathes their surface.

The skin which defines the boundaries of the tumor is red, and shines. The tumor is sometimes strangulated at its pedicle by the buttonhole perforation in the skin, through which it makes its exit. A pedicle is thus formed, and the growth continues to form above it like a mushroom. Sometimes the tumors soften before breaking through the skin, thus closely simulating an abscess. The tumors vary in volume from that of a pea to that of a small orange. If a number of these tumors spring up in the same area, they will coalesce, and vast ulceration will follow, which will be bathed in an abundant transudation of infectious serum. The seat of election for these subcutaneous verrugas are the knees, elbows, antero-external and antero-internal portions of the legs, and posterior portion of the malleoli. They rarely appear elsewhere. Their duration is not fixed, but they may, by overdistention, not only inflame and ulcerate the skin, but also cause extensive sloughing and very dangerous hæmorrhage.

Period of Desiccation, Retrogression, or Mortification.—The termination of the verruga disease varies with the course taken by the tumors. When the eruption appears on the surface of the skin the "wart" is about the size of a pea. When this size is reached, the tumor remains for some time stationary, but gradually becomes smaller and finally disappears, several months being required at times to effect complete resolution. The color also changes, the original vivid red hue gradually increasing to a deep red. As retrogression or atrophy continues, the "wart" reaches the level of the skin, and assumes the aspect of a small, blackish spot, which resembles a nævus. This spot becomes yellow, then grayish-white, and after desquamating leaves the skin in a perfectly normal appearance. When the "wart" is voluminous and subcutaneous it ulcerates and causes sloughing of the skin.

Diagnosis.—It is as difficult to arrive at a diagnosis in the early stage of the disease as it is easy to establish it after the eruption has made its appearance. Frequently the most experienced clinicians mistake the early stages of verruga for malarial fever, articular or muscular rheumatism, or for osseous syphilitic pains. One of the difficulties in the way of a differential diagnosis of verruga from malarial fever lies in the coexistence of the two diseases in the same locality. But the presence or absence of the *plasmodium malariæ* in the blood should confirm or eliminate the diagnosis of malaria in doubtful cases.

As a general rule, the probable diagnosis of verruga, in the pre-verrucous stage, is greatly suggested and strengthened by the knowledge of the patient's travels and whereabouts before his illness. When a patient is taken with a continuous remittent or intermittent fever, and complains of muscular or articular pains or cramps, and it is ascertained that he has recently traveled in the infected districts—e. g., Aguas de Verrugas, Matucana, etc.—it is almost certain that he has verruga.

Pathological Anatomy.—In studying the symptoms we have noticed that the eruption of so-called warts which takes place on the skin and mucous membrane not infrequently occurs equally as well in the splanchnic organs and serous membranes; that the muscles, bones, and joints and spine are the seat of very severe pains; that effusions in the serous cavities are of frequent occurrence; that the spleen and liver are hypertrophied; that there are disturbances in the urinary secretion, etc.; but the anatomical explanation of the characteristic symptoms has not been satisfactorily studied, and much remains to be done in this interesting field of research. Only Dr. Salazar mentions the fact of the existence of small tumors, analogous to the pseudo-verrucæ of the skin which he discovered in the mucosa of the stomach on post-mortem examination, in the surface of the liver, and in the tissues of this viscus, which, as he adds, he had found intensely congested.

Renaud, Cornil, and Dounon, after an examination of the verruga tumors brought by the latter to France, classify these tumors with the fibroid (spindle-celled) sarcomata. Bordier (Géographie Médicale, 1884) endeavors to establish a certain analogy between verruga and the Aleppo or Biskra boil. Corre shows a disposition to place verruga in the same category with mycosis fungoides, or cutaneous lymphadenie, but even a superficial comparative study of these diseases will convince an unprejudiced observer that verruga is a disease *sui generis*, and that while it may exhibit a few apparent analogies with the diseases mentioned in individual cases, it is nevertheless a unique type of a general infection which is due to a specific cause, and one eminently worthy of a distinct place in nosology.

The most interesting and by far the most modern study of the pathological anatomy and histology of verruga has been made by Dr. Yzquierdo, Professor of Histology at the Medical College of Santiago, Chili; and as his work is the most comprehensive and satisfactory that has yet been published on this phase of the subject, we will quote his observations literally:

Morbid Histology.—The cutaneous formations commonly known as warts (*verrugas*) are not really warts in the anatomical sense of the term. They are in reality tumors of the connective-tissue type, which are due ordinarily to the proliferation of the deeper layers of the subdermal connective tissue. We subdivide these tumors into three classes, according to the seat and depth of the lesion in the derm or hypoderm:

1. Tumors which spring from the superficial layers of the skin, in the papillæ themselves, under the Malpighian stratum; these tumors are generally small, spherical, and pedunculated.

2. Tumors which arise in the deeper layers of the derm; they are larger than the preceding; they develop toward the surface of the skin, which is thinned little by little, and is finally undermined by ulceration.

3. Tumors which are formed originally in the subcutaneous connective tissue; they are capable of very considerable development; they are spherical or ovoidal in shape, and cause an elevation of the healthy skin above in proportion to their development; they can be felt as subcutaneous growths under the skin, which is gradually thinned by pressure.

Structure.—These tumors are formed essentially by a mass of cells resulting from the proliferation of connective tissue. The histological disposition of these cells and of the intercellular stroma strikingly resemble sarcoma. The medium-sized growths are formed by cells held together by a variable but almost always small amount of connective tissue. In the larger tumors, and especially in their center, is seen a typically cavernous tissue which is identical with that of the cavernous angiomata. The tumors are encapsulated in concentric layers of fibrous connective tissue.

The cells are often spherical, like those of granulations, and are separated by a small quantity of intercellular connective tissue, which assumes a striated appearance. At other times the cells are much larger and slightly flattened, and, with their nuclei, imitate the appearance of *giant cells.* The tissue is then less compact. Sometimes the intercellular connective tissue is bunched in bundles which separate the cells into groups of cell masses and hold them in alveolar spaces, as it were. At other times this intercellular substance is disposed like a network, imitating very closely the appearance of adenoid tissue, the cells being interspersed with this type of tissue. In other places the section will show a marked preponderance of stroma, and the cells are scant, the neoplasm then simulating a fibro-sarcoma. The histology of the pseudo-verrucous tumors would therefore class these growths with the sarcomatous group, though they can not be regarded as identical, as erroneously taught by Dounon and Renaud.

Verruga tumors are formed by an irritation of the connective tissues, which is caused by the presence of a specific micro-organism. Thus, histologically, these lesions bear a greater resemblance to leprosy and tubercle than to anything else.

All these tumors are very rich in blood-vessels, and in many sections the capillaries are thrombosed with bacterial colonies. The cavernous structure is very frequently found. There are some tumors which are formed exclusively of cavernous tissue. This extreme vascularity accounts for the very serious hæmorrhages which at times follow the simplest touch.

Bacteriology.—A bacillus was discovered by V. Yzquierdo and carefully described by him in 1885 (Spaltpilze bei der "Verruga Peruana," in Arch. f. Path. Anat., etc., Berlin, 1885, xcix, 411–418). This bacillus averages from 8 μ to 10 μ, though it may be as long as 20 μ. The bacilli are usually a little larger than Koch's tubercle bacillus. The great variation in length is no doubt due to the different stages of growth of these micro-organisms. The longest and shortest specimens are found always in the sections of the tumors; the medium sizes inhabit the healthy skin and the capillaries in the neighborhood of the warts. When amplified two hundred and fifty diameters, the bacilli have the appearance of little rods which show thickenings or dilations at various places. Under greater amplification these rods can be readily decomposed into coccal granulations of a spherical or elliptical shape, which are very sensitive to coloring agents. The connective material which holds them together in a chain is much less sensitive to aniline dyes. The morphological details of these micro-organisms are carefully analyzed by Yzquierdo, but we can only refer the reader to his paper and terminate our presentation of this part of the subject by quoting his *conclusions*, which certainly appear to be based upon very careful and trustworthy data:

1. The tumors known as *verrugas* are neoplasms of connective-tissue origin, and not warts in the anatomical sense of the word.

2. Their structure resembles that of the sarcomata. In many of these so-called warts cavernous tissue predominates. Sometimes the intercellular substance assumes the adenoid type.

3. Micro-organisms, presenting distinct morphological characteristics, are found between the anatomical elements of the neoplasms, and also inside the blood-vessels, which they sometimes completely obstruct.

4. The same micro-organism is found in the blood-vessels of the healthy skin which covers the subcutaneous variety.

5. A micro-organism circulates in the blood of verruga patients, which

is deposited in the connective tissue, preferably the skin, where it determines the formation in certain localities of nodes and tumors which have been wrongly named warts.

6. There is no reason to believe that these micro-organisms are the result of post-mortem contamination, because of their constant presence in the blood-vessels of the diseased tissues, where they proliferate so actively that they cause emboli, but also because they are seen in the capillaries of the healthy skin.

The examination of the tissues of the unfortunate Carrion revealed the presence of a micro-organism similar to that described by Yzquierdo, though this has been denied by some. Dr. Ricardo Flores, of Lima, has also devoted considerable attention to the bacteriology of verruga, and has confirmed the presence of a micro-organism, though the writer is not aware that he has ever published a description of the parasites as seen by him.

Etiology and Pathogeny.—Age, sex, race, do not influence or modify the verruga poison, from the etiological standpoint. There are persons that are refractory to the disease, as well as others who are predisposed to it, without, however, any clear reason or explanation. Among the conditions that appear to favor the development of the disease in man are exhaustion from any cause; constitutional or accidental weakness—such, for instance, as that which is due to preceding illness; and especially the want of acclimatization in localities in which verruga is known to prevail.

The lower animals are not exempt from verruga infection, the bovine, equine, and porcine species being particularly predisposed; hence the name *verruga mular*, or mule verruga, because it frequently attacks mules.

Popular opinion asserts in Peru that verruga can only be contracted in the *foci* in which it prevails endemically. Its transmissibility by proximity, contact, or cohabitation is not proved.

That the disease is inoculable can not be doubted, if we consider the result of inoculation in the case of the lamented medical student, Carrion, who, in his eagerness to test this question, had himself inoculated (1885) with a wart taken directly from a typical case of verruga.

Is a prolonged sojourn in the verruga country necessary to contract the disease? It is generally believed, both by professional and lay observers, that a very short residence—a few weeks, even a day—is sufficient to contract it. Surgeon George A. Ward, of the Callao, Lima, and Oroya Railway, says, "I have known a nursing infant to pass one night in the affected district and in three weeks break out over the entire body with verrugas." One attack does not render the patient less liable to a second, and some persons have had it as many as three times (Ward).

What is the essential verrugenic agent? What is its true habitat? Does it inhabit the water, air, or soil of the locality in which it is endemic? No one has yet satisfactorily answered these questions. The only fact that has been positively ascertained is that the verruga disease is transmissible by inoculation from one human organism to another (Carrion); and the conscientious bacteriological research conducted by Yzquierdo would lead us to believe that the essential causative agent of the disease is a bacilliform micro-organism, which only finds a congenial habitat for its development and propagation in some of the valleys of the Peruvian Andes.

THE RELATION OF VERRUGA TO OROYA FEVER.

The great disturbance of the soil caused by the excavations, etc., which attended the construction of that wonder of engineering skill known as the Callao, Lima, and Oroya Railway, from 1870 to 1874, appears to have given birth to a new type of pyretic infection, which by virtue of its malignity threatened to annihilate the whole enterprise. The railroad in question was intended to connect the port of Callao on the Pacific with Oroya, on the head waters of one of the tributaries of the Amazon River, distant about one hundred and thirty miles from Callao. This road crosses the Andes at an elevation of sixteen thousand two hundred feet, with a summit tunnel three thousand feet long. The road necessarily coursed through the heart of the verruga district in the Andes; and it was while the workmen of the road were engaged in its construction, and while in the valleys of Huararichi, in a zone comprised by Cocachacra (1,020 metres high), and Zurco (1,996 metres), that the laborers, most of them sturdy and healthy Chilians, began to sicken and rapidly succumb. The hospitals of Lima were soon crowded with the patients suffering with this mysterious fever. The mortality reached sixty to seventy per cent, and it is said that during the construction of the Oroya Railroad, for a period of four years, five thousand people died from among those employed (Lung). The malady resembles a pernicious malarial fever of an intensely severe type. It was observed by the physicians that many of those who survived suffered from an eruption that resembled verruga. This, coupled with the fact that the new fever had made its appearance almost exclusively in the verruga valleys, led to the suspicion that it was only an intense and malignant manifestation of the verruga infection, caused by the extensive excavations and soil disturbances in the construction of the roadbed, and the invasion of the infected districts by such vast armies of unacclimated individuals. This question has given rise to considerable argument.

The theory of the unity of the two diseases was ably sustained before the Academy of Medicine of Lima, in 1873, by Dr. Enrique Basadre, who was followed in 1875 by Drs. Espinal, Salazar, Celso Bambaren, Manuel Barrios, and others, in a discussion on the subject before the same body. But the fatal experiment which resulted in the death of the ill-fated medical student, Daniel E. Carrion, of Lima, served to confirm the theory of the unity of the two diseases in a most emphatic manner.

Carrion had himself inoculated by a medical friend with a typical tumor from the skin of a verruga patient. A fever developed after twenty-two days of incubation, which he and his attendants recognized as a typical Oroya fever, which terminated fatally before any external signs of the pseudo-verrucous eruption could be recognized. The autopsy revealed, nevertheless, that a typical nodular eruption was beginning to appear under the skin just as death had taken place.

Since Carrion's experiment the identity of the two diseases has been generally admitted in Peru.

Duration.—The course and duration of verruga are extremely variable. A great many circumstances influence the eruption of the characteristic tumors, and these tumors are greatly influenced in turn by their environment. Dounon estimates in a general way that the duration of the whole process oscillates between two and eight months, and that the history of the individual growths varies from one to three months.

Prognosis.—Statistics are wanting to enable us to establish the general ratio of mortality, but it is manifest that verruga is a very serious and dangerous affection, especially when the patient is compelled to remain in its native habitat. The prognosis is most materially affected by climatic change and an escape from the mountain regions to the sea. In a general way the prognosis must be exceedingly reserved when the febrile period of invasion is severe and of long duration, for that would indicate profound poisoning and the early advent of the cachexia. An eruption which appears early and typically, is of good omen, on condition only that the tumors do not assume the hæmorrhagic type, and that their elimination be not attended with gangrene or suppurative processes, which would lead to mixed microbial infections and consequent cachexia, etc.

Prophylaxis.—No means have thus far been discovered that will prevent the infection of the organism of those who expose themselves to the influence of this remarkable poison. There would be reason to believe that vaccination with the attenuated virus of the disease would serve as an efficient prophylactic, but the fact that one attack does not confer immunity from another discourages this possibility. The only preventive, therefore, is the avoidance by travelers of the infected foci.

Treatment.—Dr. Ward, who was the chief surgeon of the Oroya Railway Company, and who had consequently exceptional opportunities for observation both in himself (he had three attacks) and his patients, says:

"A great variety of native remedies has been used in this disease. I have tried them all, and found them all wanting. Of these remedies, the best is an infusion of Indian corn taken in large quantity with the native sweet wine of the country. This 'agua mate,' as it is called, has a diaphoretic and diuretic action, as have in a greater or less degree the other native remedies—'uña de gato,' 'maguey,' 'norvillo,' etc.—all of which are taken in infusion and with an equal quantity of sweet wine.

"The more classical pharmaceutical products are equally impotent in a specific sense, though symptomatic treatment finds here multiple indications. In a general way the treatment may be summed up as follows:

"1. Favor the appearance of the eruption.

"2. Sustain the forces of the organism, which will in all probability be subjected to great strain owing to the exceptional gravity of this infection, by the severe hæmorrhages of the bloody type of verrugas, also by the suppuration and sloughing of the tumors.

"Finally, whenever any one commences to complain with the symptoms of the disease, he should be at once removed from the focus of infection to the coast or seashore. This is, fortunately, a very efficient measure, and will certainly exercise a beneficial influence on the patient."

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ENDEMIC "BOILS" OF TROPICAL AND SUBTROPICAL CLIMATES. (RUDOLPH MATAS.)

SYNONYMS:

a. According to Geographical Foci.—Aleppo Evil—Boil, Button, or Sore—of Biskra; of the Nile; of Cairo; of Bagdad; of Delhi; of Sindh; of Bombay; of Guzerat; of Cambay; of the Punjab; of Delphis; of Crete; of Kandahar; of the Zibans (Guyon); of the Sahara (Le Bertheraud); Ulcer of Warm Climates (Sirus-Perondi); Oriental Boil (Villemin).

b. According to Languages.—*Latin,* Furunculus endemicus orientalis seu Tropicus. *French,* Bouton des Pays Chauds (Leloir and Vidal), etc. *German,* Orient-Beule, etc. *Italian,* Gavocciolo d'Aleppo, etc. *Spanish,* Mal de Aleppo, etc. *Arabian,* Khabb, Khabba, Frima, Khabb-el-seneh (One-year Boil), Bes-el-temeur (Date Disease). *Turkish,* Dous-el-Kourmati (Date Disease). *Persian,* Salek (Little Year). At Delhi, Arungzebi—after the Mogul, who was afflicted with this disease (Le Roy de Méricourt).

c. According to Etiological or Pathological Conceptions of Individual Authorities.—Pyrophlictide Endémique (Alibert); Dermatose Ulcéreuse (Larrey-Poggioli); Impetigo Annua (Duteuil, of Bagdad); Mycosis Cutis Chronica (Vandyke Carter); Lupus Endemicus (Leloir and Cunningham).

Definitions. *a. Clinical.*—A local disease which prevails as an endemic in limited districts in warm climates, and which presents itself chiefly on the face and uncovered parts of the body. It is characterized by the formation of cutaneous elevations, at first papular, then tubercular, which in the average course of one year enlarge, ulcerate, and finally cicatrize, leaving behind them indelible scars (Le Roy de Méricourt).

b. *Pathologico-etiological.*—A neoplasm deposited in the derma, of an inflammatory character, which does not resolve spontaneously, but tends to the partial or complete destruction of the tissues in which it is developed, and contains a pathogenic micro-organism (H. Leloir).

History.—The first observations recorded of this disease were taken from the narratives of travelers who visited Aleppo and its vicinity, such as Russel (1756), D'Hasselquist (1762), and De Volney (1787).

This endemic, thus localized by medical geographers, was made the subject of original study by Holland, Bo, and Alibert. Requin published an article in the Gazette médicale (1832) which was based on notes furnished by Disant, a French consul at Aleppo. Guilhou, who had accompanied Pariset in his travels through the Orient, contributed an interesting monograph on the subject in the shape of a Thesis presented to the Faculty of Montpellier (1833), in which are embodied a number of his personal observations. This last work served for twenty years as a basis of the various articles on the disease, which appeared in the encyclopædias and dermatological treatises of the period. From 1853 to 1855 H. Guys and Villemin, in France, and Solomonsen, Gröshel, Rigler, and Polak in other countries, assisted in completing the history of the Aleppo boil.

The military expeditions which were sent against the wild tribes of southern Algeria offered exceptional opportunities to the surgeons of the French army in the neighborhood of Biskra and in the zone of the Zibans (date oases) to investigate a cutaneous malady which was endemic in these places, and which was studied with great care from 1847 to 1860 by Poggioli, Cabasse, Beylih, Castaing, Massip, Quesnoy, Verdalle, Guyon, Armand, Weiss, A. and E.-L. Bertheraud, Netter, Sonrier, Masnou, etc.

At Guzerat, in Sindh, and Delphi, India, the English observers Balfour, Pruner, etc., encountered coincidently a cutaneous endemic disorder, which they described, and which bore a marked resemblance to the Aleppo and Biskra boils.

The temporary invasion of Syria by the French army in 1860 led to a more extensive comparative study of the Asiatic and Algerian boils, and in an excellent memoir by Hamel it became evident that the analogy between the various boils or "boutons" described was almost an identity. Hirsch, after a most learned and exhaustive study of the literature of the subject, insisted for the first time on the identity of the various endemic "boils" described in Algeria, Syria, Persia, and India, and unhesitatingly described them together as a common malady. Since the unification of this group by Hirsch the more modern and advanced researches on the subject that have followed served to confirm and accentuate the identity and unity of the various geographical groups (Le Roy de Méricourt).

Geographical Distribution.—Some idea may be obtained of the territorial distribution of this disease by a glance at the paragraphs on synonyms, and by the historical note herewith appended; but a better conception may be obtained by glancing at the accompanying sketch,

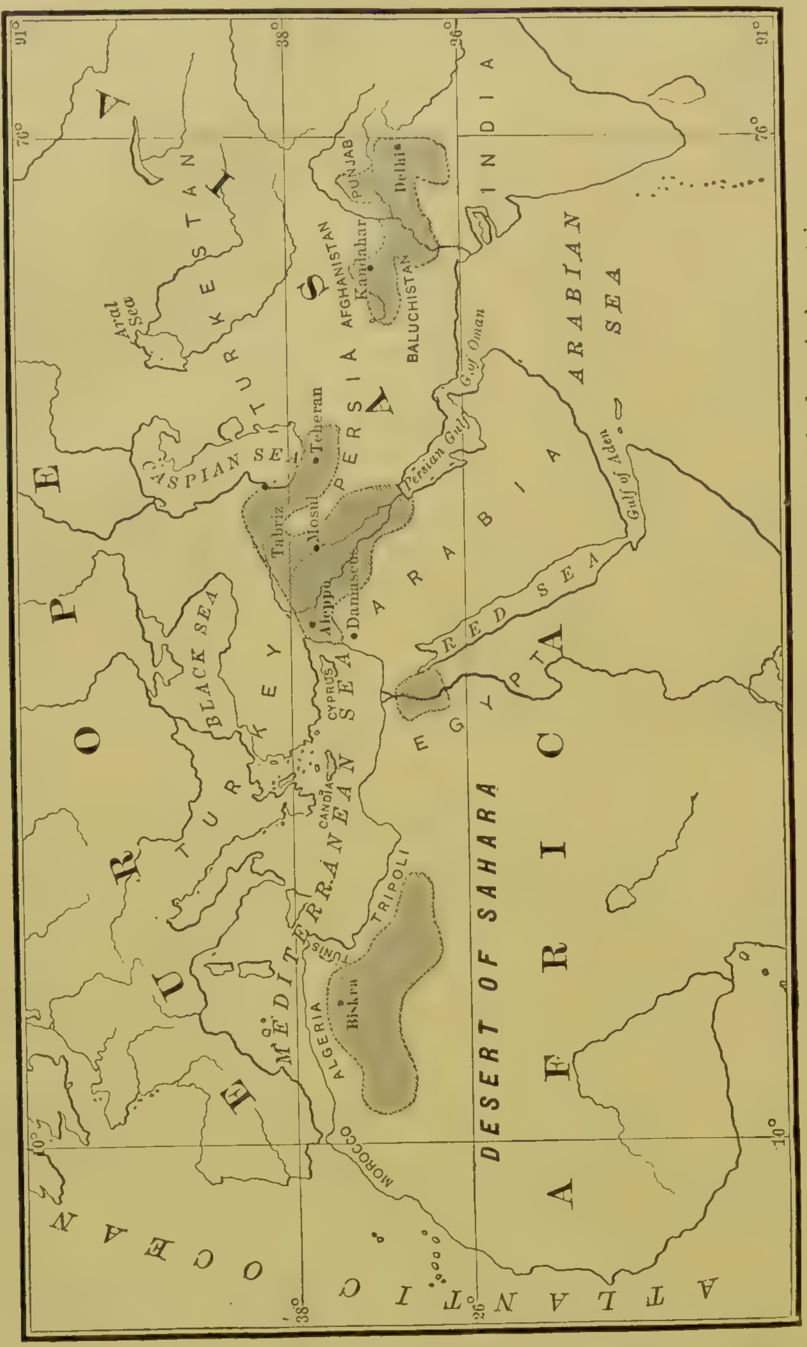

Fig. 77.—Geographical distribution of endemic boils of tropical and subtropical countries.

which has been adapted from Bordier (La Géographie médicale, Paris, Reinwald, 1884). This is, of course, a provisional sketch, as it is possible that further studies in the field of tropical and geographical pathology may yet reveal the presence of these mycotic boils in other comparatively unknown geographical areas. It may be stated at present, however, that the disease rarely prevails beyond 10° or 45° north latitude, or from 15° west and 20° east longitude. It should be remembered also that the disease is not equally disseminated throughout the countries comprised in these limits. It prevails as an *endemic* only in certain distinct foci of infection. These foci can only be indicated on the map by spots of variable extent. The individual areas of infection are, however, in some cases well circumscribed, so that beyond their limits the most perfect immunity is enjoyed by the inhabitants. "At Delhi, for instance, the disease is distinctly endemic within the city walls, but not in the suburbs —a fact which indicates local foci of propagation." During the Sepoy rebellion, in 1857, this fact was well illustrated by the immunity enjoyed by the besieging army, and the prompt manifestation of the disease shortly after the victorious English troops had been quartered within its walls. The native garrisons enjoy this immunity when out of the city limits, but also pay their tribute to the disease when they become residents.

Symptomatology.—The onset of the disease is free from prodromata, and without febrile symptoms. All observers agree that wherever the disease exists it presents three distinct stages: 1, The period of formation or tumefaction; 2, the period of ulceration; 3, the period of repair or cicatrization.

First Stage.—This commences with itching, followed by the appearance of a reddish spot, which has been described by Fleming (quoted by Chrystie, *vide* T. McCall Anderson, Treatise on Diseases of the Skin, etc., Amer. edition, 1887) as resembling "a mosquito-bite with the skin slightly elevated. On examination, a number of blood-vessels are seen radiating from the center of this little red spot, which gradually enlarges without any pain, throws off its epithelium, becomes smooth and flat on the surface, and assumes a shining appearance and a relative degree of transparency. The growth slowly increases in size, and often spreads irregularly to a considerable distance from the center by little ridges of smooth skin. It would appear first to attack the roots and sheaths of the hair while it is extending. The growth, or any of its prolongations, pits on pressure, and causes a stinging sensation, contrasting with the healthy skin around."

The swelling is very slow in forming, so that, from the size of a small, pealike nodule, it requires four or five months to attain the size of a common furuncle.

Second Stage.—At the end of four or five months this stage is initiated by the softening of the boil-like swelling. The surface is studded over with deeply seated, yellowish-white points, which are altered and inflamed hair and gland sacs; an ichor is discharged from the soft center of the tumor which results in the formation of a scab; and if the boil or sore be irritated, ulceration begins beneath the scab. Healing may take place without ulceration, but, as a general rule, ulceration goes on beneath the crusted pustules. The sore is surrounded by a red zone; papules are developed around it; it enlarges by ulceration; the surface is red, flabby, irregular, and studded over with fungoid granulations that bleed freely; it is painful, discharges a thin ichor, shows no tendency to heal for a considerable time, and its edges are hard (Chrystie). The ulcers vary greatly in extent; they frequently coalesce and form large, granular patches. In a case reported by Bertheraud, the whole gluteal region was one raw surface, formed by the blending of the ulcerated margins. The typical single ulcers are about the size of the thumb nail—adult (Volney). They are ordinarily from two to five centimetres in breadth.

The secretion from these ulcers is rarely typically purulent. It is usually serous or sero-purulent. It acquires, especially if it has been retained for some time under the crusts, a peculiar *sui generis* disgusting odor. An areola of erysipelatous redness surrounds the ulcer, and gradually blends with the natural color of the skin. Frequently the lymphatic glands and vessels of the region involved are engorged and painful. At all times the ulcer itself causes but little pain, except during cold weather, when the sores are the seat of shooting pains at night, and pruritus causes insomnia.

Third Stage.—After a variable length of time the hard edges of the ulcer become soft, and the areola loses its redness and finally disappears altogether. Healthy granulation appears in the center of the ulcer, and whitish cicatricial islands extend toward the periphery. The crust that covers the sore is repeatedly cast off during this stage, and each time a healthier and smaller ulcer is left behind. Finally, when the last scab is shed, a firm cicatrix of a livid color is discovered in place of the raw surface. Gradually it changes color and becomes entirely white, like the scar of a burn of the third degree, and, like it, remains an indelible mark on the surface. Sometimes the cicatrix becomes deeply pigmented. Usually three or four months elapse before the healing of the sores is completed.

Varieties.—The preceding description applies to the typical boils—but this disease may present several varieties in the course of its evolution. Sometimes the ulcerations are deeper than usual; they are progressive, and spread far away from the original point of departure; this type constitutes (1) the *rodent* or *ulcerative variety*. Sometimes the floor of the ulcer is covered with exuberant granulations which overlap the edges; the granulations have a pronounced *papillomatous* appearance; this is (2) the *papillomatous* or *villous variety*. This variety is described by

Poggioli, Massip, Weiss, Sonrier, Le Roy de Méricourt, etc. Sometimes the boils remain stationary in the *papulo-crustaceous* stage, simply forming scabs; they do not ulcerate, but remain dry; this is (3) the *papulo-crustaceous variety*. It is the most common. In other cases the disease appears to be aborted during the period of formation. There is the usual papulo-tubercular eruption, but it never goes further than a simple furfuraceous desquamation; this is (4) the *abortive papulo-tubercular form*, which may heal in three months without forming scabs. Sometimes the lesions are concentrated in one spot, and, owing to the great aggregation of boils in a given area, they *become confluent*, and in consequence we have thus (5) the *confluent* or *coherent form*.

Period of Incubation.—There appears to be a period of incubation from the moment of the exposure to the contagion to the appearance of its manifestations in the cutaneous surface. This period has not been exactly determined, but it exists nevertheless. The cases quoted by Leloir, Vidal, and Brocq would prove that this period may be of fifteen days' duration. These are the most reliable observations. The impression that prevails among observers is, however, that the period of incubation is variable; the older writers claimed that it might vary from a few days to twenty years; but this last assertion is extremely improbable, and must be due, as Le Roy de Méricourt suggests (*loc. cit.*), to some error in observation or diagnosis. Three months' residence in an infected locality is about the time required by the unprotected to contract the disease. On the other hand, it is certain that a long sojourn in an infected locality is not required, because authentic observations have been recorded (Leloir and Vidal, *loc. cit.*) of travelers who simply stopped at Biskra on their way to other places, and who nevertheless contracted the disease.

Influence of other Diseases on the Career of the Boils.—No constitutional disturbance accompanies the eruption of these so-called boils. Any intercurrent disease is not affected by their presence, nor does any disease apparently exercise any influence upon their regular course. Goodwin, of Delhi, noticed, however, that smallpox appeared to hasten the period of repair in the advanced ulcerative stage of the boil disease.

Number of Boils.—The disease may manifest itself by the eruption of a single boil. This is rare. In Aleppo, when this is the case, it is called a "male" boil; when there are many, they are called "female" boils. When the tumor is only small and suppurates very little, and is aborted in its course, it is known as a neutral boil. Villemin saw fifteen and twenty-one on different patients; Hamel, fifty; Disant, fifty-six; Guilhau, seventy-seven. According to most authors, it is the crustaceous form which is characterized by the greatest number of boils. This dissemination of the eruption is not surprising, when we consider that one of the most familiar types of this disease—the Biskra button—is *inoculable* and *auto-inoculable* (A. Laveran, Contribution à l'Étude du Bouton de Biskra, Ann. de Dermat. et de Syphilig., 1880, p. 173).

Cutaneous Distribution.—The exposed parts of the body are the most frequently attacked. According to Goodwin (quoted by Le Roy de Méricourt), of Delhi, the order of frequency of the regions affected may be stated as follows: the elbows, the forearm, the dorsal surface of the hands and fingers, the ankle, the leg, the face, the thighs; rarely the trunk. It is exceedingly rare in the scalp, but in the genitals it may occasionally appear (Poggioli, Laveran), where it resembles the chancroid in its earlier stages, and is liable to lead to confusion in the diagnosis. "Almost all observers agree in stating that the natives are most frequently attacked by the disease in the face, while foreigners suffer with it in the extremities."

Duration.—Several native names for the disease suggest its duration: Arabian, *khabb-el-neh*, the one-year boil; Persian, *salek*, little year. But while this expression of popular observation is, generally speaking, true, there are many exceptions to the rule. The disease may indeed exhaust its whole career, including all its typical phases, in six or eight months; but, on the other hand, it may drag along slowly and tenaciously not one but many years. The average duration, however, is six to seven months (Vidal and Leloir).

Complications.—The complications of this disease are comparatively rare. Lymphangitis, erysipelas, or phlebitis, may occur, but not more commonly than as complications of simple ulcers. In the graver forms, which are met in weakened, cachectic, or alcoholic subjects, phlegmonous inflammations and sloughing may occur, which may eventually lead to the death of the patient.

Repetition of Attacks.—At one time it was erroneously believed that one attack invariably conferred immunity for all future time; but further experience and observations have conclusively proved that the disease may manifest itself several times in the same individual (cases of Villemin, Masnou, Bédie, etc.), though this is not the rule.

Diagnosis.—The peculiarly slow evolution of this disease, which is one of its chief clinical and distinctive characteristics, is liable to lead to frequent doubts as to its differential diagnosis from other affections.

In the period of formation it may be mistaken for a furuncle or a carbuncle; but a little time and observation, with a knowledge of its endemic prevalence in the locality, will promptly dispel all doubts.

In the period of ulceration, when the sore is covered with heavy crusts, it may be mistaken for rupia, ecthyma, lupus, or syphilitic lupoid disease. The history of the case, the general condition, the endemic prevalence of the " bouton " disease, and a careful observation of its evolution, coupled with the therapeutic tests, will usually clear all obscurities.

In countries where frambœsia, or "yaws," is endemic in common with the Oriental boil disease, the differentiation between the two diseases will probably become at times a source of embarrassment at the bedside. But while these diseases have many points in common, there are nevertheless very important differences between them. "Yaws is preceded by febrile symptoms; Oriental boil by none. In yaws the lesions are always multiple, and often in crops; the boil is most frequently single, and, if more than one, they are rarely numerous. While both attack the face, yaws prefers the palms and soles; the boil, the back of the hands and feet. The lesions of both are papules succeeded by nodules, but in yaws the epidermis splits off in a few days, and the whole eruption is developed in from two to four weeks; but the nodules of the boil remain unchanged for weeks or months. When the crust of the boil is removed an ulcer is exposed; when that of yaws is removed a moist tumor is brought into view, and yaws never ulcerates except in the cachectic, and when irritated. The yaws tumors dry up and fall off, leaving no scar; the boil necessarily leaves a deep scar. Finally, yaws is almost limited to the colored races, especially negroes, while the boil attacks all within its sphere of influence" (R. Crocker).

At one time specific differential characteristics were sought for between the boils as manifesting themselves in Aleppo, Biskra, Bagdad, Delhi, etc., but a more thorough study has decided conclusively that these differences were more fanciful than real, and that there is but *one* boil disease, which may possibly be modified by topographical conditions, but which is nevertheless always the same in its essential characteristics.

Prognosis.—The Oriental boil disease invariably tends toward final resolution and recovery, so that the disease *per se* is not dangerous to life, except when it is manifested in very debilitated or cachectic subjects. The ulcerative stage is the period of the disease which is most annoying, and which requires greatest attention. The most serious feature of the affection is the disfigurement caused by the ulcers when seated in the face, and by the cicatricial marks which it permanently leaves behind it.

According to Thomassini, a resident practitioner at Aleppo, it would appear that for several years past the boil disease has been gradually losing its intensity in that stronghold, whereas in other localities, such as Joppa, Mossoul, and Bagdad, it is still very active, and occasionally causes death (A. Barralier).

Etiology.—The fact that the tropical boil is endemic in certain well-defined geographical areas—i. e., that it has distinct habitations, that it prevails at certain seasons of the year, that it is experimentally inoculable, and that it is clinically contagious—would suggest the microbic nature of its essential cause. This *a priori* induction is firmly supported by the latest bacteriological researches, which have almost conclusively demonstrated that the disease must henceforth be classed with those caused by a *contagium vivum.* While the general auxiliary causative influences which were in earlier days regarded as the essential etiological elements are now to be relegated to a secondary plane, they can nevertheless serve as predisposing agencies, and should still command our attention in studying the environment, etc., which is necessary to the successful development and propagation of the pathogenic micro-organisms.

In the section on geographical distribution we have already insisted upon one of the most striking features of this disease—viz., that it prevails only in warm or tropical climates—and also noted the curious observation that, while the disease may be endemic in even large territorial areas, it may still be very well circumscribed in its foci of endemic prevalence ; so that a zone of complete immunity may encircle the most typical foci of infection, as in the case of Delhi, and yet there may be no apparent local topographical condition to account for this immunity.

In addition to the great influence of thermal lines and the existence of circumscribed areas of prevalence, we should lay stress upon the very *marked* influence of the seasons upon its epidemic prevalence. In the infected districts the disease begins to display its activity in September, and the number of cases increases in October and December ; in January the new cases are few, and grow more scarce afterward, so that by March or April there are no more new cases, and the old ones have reached their maturity and are getting well. The intensity of the epidemic is variable every year, but it is usually at a minimum in the autumn. An idea of the extent of the epidemic may be gathered from the statement of Weber, who says that at Biskra, in one year, out of a battalion consisting of three hundred and seventy-five men, thirty per cent were afflicted with the disease.

As usual with all endemic diseases, the potable water, atmospheric conditions, and certain articles of diet—e. g., dates—have been incriminated in the etiology, but the careful study of these supposed agencies has entirely exculpated them from any *specific* influence in the causation of the disease.

Whenever the boils prevail endemically, they attack indiscriminately all classes of the population without distinction of sex, age, race, or nationality. Polak, who studied the disease in Persia, noted its prevalence among the native Caucasian and Mongolian populations with as much frequency as among the negroes, but remarked that in that country the Europeans were less frequently attacked. In Syria, the latter do not appear to enjoy this immunity, while in Algeria they are the preferred victims of the disease (Hirsch). The contagiousness of the Oriental boil disease has been prominently brought into relief by the experiments and observations of Weber, Laveran, Boivet, Deperet, Chantemesse, and others. Long ago Deszenettes had tried fruitlessly to inoculate the "Aleppo" boil; but later on Villemin obtained positive results, which were confirmed by Weber, Boivet, Deperet, Chantemesse, etc.

The contagion may be introduced into the economy by a variety of methods, but the majority of observers believe in its direct inoculation through abrasion in the skin. It is an admitted fact that in the epidemic season the most trifling traumatism is liable to be followed by a typical "boil" in the predisposed class (those who have never had the disease). Laveran insists upon the *rôle* of blisters, various traumatic erosions, vaccination ulcers, and the pustules of eczema, acne, impetigo, etc., as open avenues for the introduction of the virus. Mosquito stings are accused of being the frequent means of propagation of the disease, and the scratching caused by the stings of other insects may also enter as a factor in facilitating the admission of the poison into the organism. This idea of local or direct external inoculation explains to us more clearly why the *exposed* parts of the body are the most frequently attacked by the disease. As previously mentioned, the trunk is rarely and exceptionally the seat of the Oriental boil.

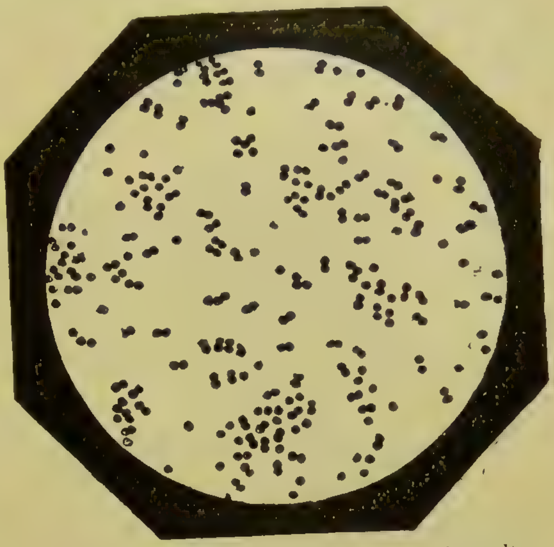

FIG. 78.—Microbes of Biskra boil (pus); culture upon peptonized gelatin; coloration by the method of Gram (Leloir and Vidal).

Bacteriology.—With so suggestive and inviting a field before them, it is not surprising that bacteriologists should have endeavored to solve the problem of the *vera causa* of this disease at an early date. We find that, in 1876, Weber in Algeria and Vandyke Carter in India seriously discussed the microbic origin of the disease—the latter referring to the Delhi boil as being caused by a parasitic organism consisting "of spheroids and mycelium, which occupy the distended lymphatic vessels in and around the sore," etc. The researches of Laveran (1880), Boinet and Deperet (1884), Duclaux and Heydenreich (1884), Cunningham (1885), Riehl and Paltauf (1886), H. Leloir (1886), Poncel de Cluny (1887), Bauquet (1887), and finally the critical summary of Leloir and Vidal (1890), all added more or less to our knowledge of the bacterial origin of these boils; though which one of the micro-organisms described is the specific and real pathogenic element has not been absolutely decided. The confirmatory and more thorough researches of Chantemesse (1887) and H. Leloir (1886 and 1890) would tend to rest the claim for specificity on the micrococcus discovered by Heydenreich in the Punjab sore, and Duclaux in the Biskra boil.*

Chantemesse was able to secure, in an independent research, pure cultures of a micrococcus (from boils contracted in Biskra) which was identical with that described by Heydenreich and Duclaux. According to Chantemesse, this micro-organism has special morphological and biological characteristics, which differentiate it from other known staphylococci and streptococci. In addition to this, by injecting pure cultures of this micrococcus in the human subject (an experiment never tried before), Chantemesse (1887) was able to obtain a cutaneous lesion which had all the appearance and characteristics of the Biskra boil.

Experiments on animals, rabbits especially, in which cultures were injected by Chantemesse and Leloir, were followed by variable and as a whole unsatisfactory results.

It should be remembered also that the micrococcus of Duclaux and Heydenreich is almost identical in its morphological and biological characteristics with the micrococcus first studied by Leloir in the disease known as *confluent perifolliculitis en placards*, which was also first described by this distinguished observer, and which has very striking clinical analogies with the Oriental boil disease.

An identical micrococcus was apparently discovered and cultivated in the potable water at Biskra, by H. Leloir and his pupil Loustalot, though the experimental evidence obtained by injections of pure cultures in the lower animals is far from establishing the identity of this micrococcus with the true cause of the Biskra boil.

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* The following are the characteristics of the micrococcus of Heydenreich and Duclaux:

Morphology.—Diplococci, from 0·86 μ to 1 μ in length, surrounded by a capsule; sometimes associated to form tetrads.

Stains.—With the usual aniline colors.

Biological Characters.—An *aërobic, liquefying* micrococcus. Grows in the usual culture media at room temperature. In *gelatin-stick cultures*, at 20° C., at the end of forty-eight hours' growth occurs along the line of puncture in the form of small, crowded colonies, which produce a grayish-white line; upon the surface a thin, circular layer of a yellowish-white color is developed. At the end of three to four days liquefaction commences near the surface, when a funnel is formed which extends until about the fourteenth day, when the gelatin is completely liquefied. Upon the surface of agar, at 37° C., a grayish-white or yellowish layer is formed at the end of twenty-four hours, which has a varnishlike luster. Upon potato, at 30° to 35° C., at the end of forty-eight hours a white or yellow layer has developed.

Pathogenesis.—According to Heydenreich, inoculations in rabbits, dogs, chickens, horses, and sheep cause a skin affection which is identical with that which characterizes Biskra buttons in man. When rubbed into the healthy skin it also produces the development of abscesses.

Heydenreich, 1 vol., 116 pp. St. Petersburg, Russia, 1888; Abstract im Centralb. für Bakteriologie, Bd. v, 1888, p. 163. (Sternberg, Bacteriology. William Wood & Co., New York, 1893.)

Apropos of inoculation experiments on animals, it should be stated that many observers claim that the Oriental boil disease is common to the lower animals as well as to man. Dogs and horses are supposed to be especially liable to its attacks, but De Méricourt is very much inclined to the opinion that this is an error of observation; the boil-like tumors produced by the larvæ of the œstridæ, such as the hypoderma bovis or dermatobia, being mistaken for the Oriental or true mycotic boils.

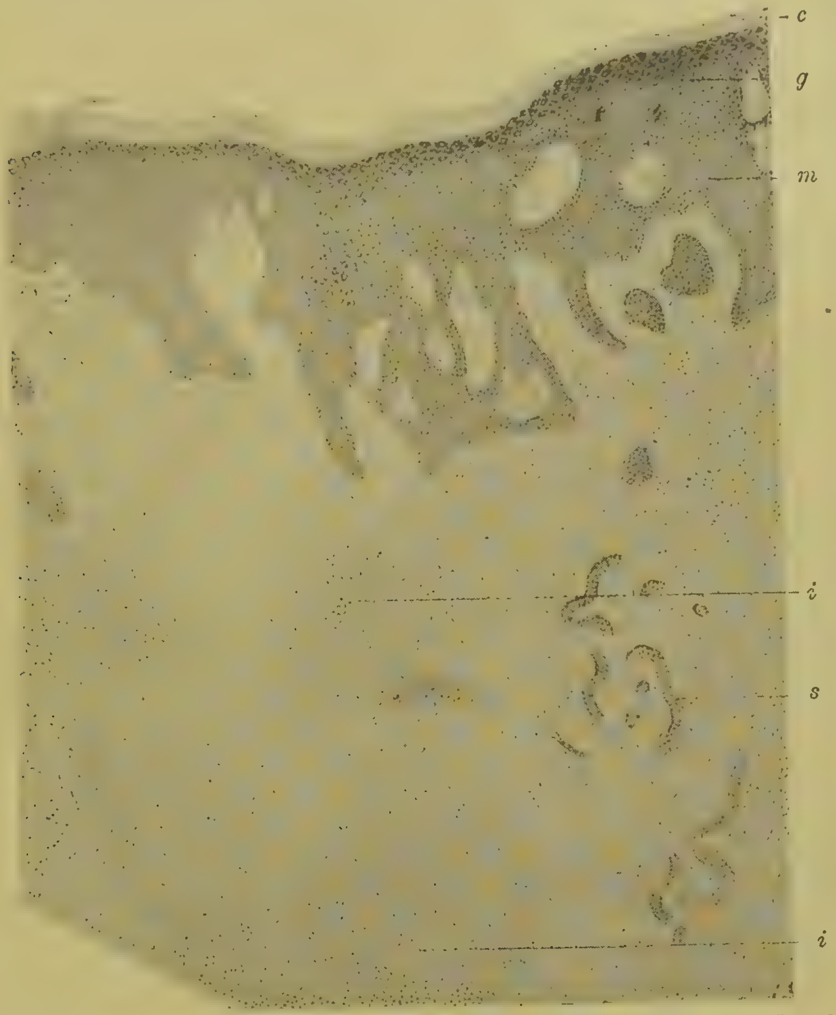

Fig. 79.—Section of Biskra boil (papillomatous stage). × 55 (Leloir and Vidal).
c, horny layer; *g*, hypertrophied granular layer, the cells of which are very strongly charged with eleidine; *m*, malphighian layer, thickened and showing in the derma hypertrophied and ramifying interpapillary prolongations; *s*, canal of a sudoriparous gland; *i*, nodular neoplastic infiltration of a Biskra tubercle.

Pathological Anatomy.—The histological lesions of the Oriental boils of tropical climates have been studied with greatest care—as it manifests itself in Biskra (bouton de Biskra), where it has been made the object of special research by one of the most authorized and distinguished exponents of the modern French school of dermatology. Henry Leloir and Émile Vidal, in their unfinished but remarkably original treatise (*loc. cit.*), summarize all our present knowledge on the subject in so satisfactory a manner that we would be doing an injustice to our readers if we did not adopt a synopsis of their contribution as an *exposé* of the modern status of this aspect of our subject.

The histological lesions of the boil disease are constituted by alterations which are seated in the *epiderm*, the *derm*, and sometimes even the *hypoderm*. The alterations present a great analogy with those observed in sections of cutaneous tubercles in general, and those of lupus vulgaris in particular. The pathological anatomy of the Biskra boil is, in fact, entirely embodied in the definition given by Leloir of a tubercle when considered simply as an elementary lesion of the skin. "It is a neoplasm which is seated in the derm, of an inflammatory character, which does not resolve spontaneously, and which tends consequently to the total and partial destruction of the tissues in which it is developed, and contains a pathogenic micro-organism."

Epidermal Lesions.—As in the case of lupus, the histological lesions which are observed on a level with the epidermis vary according to the cases. Sometimes the epidermis is destroyed by a mechanism of cavitary formation, which was first described by Leloir, and by the consecutive formation of intra-epidermal purulent nests, just as observed in the ordinary process of vesico-pustulation. The cavities contain, in addition to an abundance of pus-corpuscles, numerous red blood-cells, as demonstrated by Kelsch (quoted by Weber and Laveran). In this manner are formed the ecthymatoid pustules of some types of the boil disease.

Again, by the formation of purulent phlyctenules—i. e., by a process of cleavage which takes place generally on a level with the stratum granulosum—the epidermal destruction is effected. More often, especially on a level with the older and papillomatous boils, which are observed in the French hospitals on patients who have returned with the disease from Africa, the following alterations have been observed:

The horny epiderm is thickened in certain points; it has fallen off at others. A certain number of the cells of the horny layer show a nucleus and a protoplasm which are clearly colored by carmine, which would indicate a tendency to desquamation, as was taught by Leloir and Vidal in 1882 (Note sur l'Histologie du Psoriasis, in Comptes Rendus de la Société de Biologie).

The granular layer is slightly thickened, and its cells contain much eleidine. The Malpighian bodies, thickened in places, send deep prolongations, which are large and ramified, into the derm, as is observed in certain dermic cutaneous affections, which manifest a papillomatous disposition.

In a word, these lesions remind us of the appearances observed in certain forms of papillomatous lupus.

Dermal Lesions.—The lesions of the derm are the most essential. The derm is infiltrated with embryonal cells, which are grouped in certain points to form islands or nodules, and which give to the section the general appearance of skin infiltrated with lupus vulgaris. This infiltration by embryonal cells is especially dense about the vessels which are inclosed by a cuff formed by the infiltrating elements; the same deposition is noticed about the glomeruli of the sudoriparous glands. The infiltration appears to follow also the lymphatic spaces. The infiltration of the specific neoplasm, whether in the form of islands or as a diffuse infiltration attains its maximum intensity on a level with the derm and in the center of the boil. In peripheral portions of the boil the infiltration is much less dense; here it simply dissociates the connective-tissue fasciculi, which are often altered and vitreous. This peripheral infiltration extends into the surrounding cutaneous territory that is apparently healthy to the naked eye. In some cases the islands of infiltration may be observed even in the thickness of the hypoderm.

Giant cells were met with in only one case by Leloir and Vidal, though Riehl (Zur Anatomie und Histologie der Orient-Beule; Vierteljahres. für Derm. und Syph., 1886, p. 805) appears to have found them quite often.

In the center of the boil the pilo-sebaceous follicles are destroyed. The same may be said in part of the sweat glands. The blood-vessels present infiltrated walls, a thickening at their middle coat, and obliteration of their lumen in consequence of a proliferation of the endothelial cells (obliterative endoarteritis). The nerves when examined in section, or when isolated by dissociation, are healthy.

Treatment.—This may be subdivided into (*a*) *preventive* and (*b*) *curative.*

(*a*) *Preventive.*—This has been briefly but completely summarized by Sir Joseph Fayrer (article Delhi Boil, Quain's Dictionary) in the following paragraph: "Cleanliness of person, clothing, and habitation, good food, the use of pure drinking water, and a careful attention to the sanitary condition of the locality, avoiding overcrowding, and contact with the disease in men or animals, are the best means of prevention."

(*b*) *Curative.*—All the older remedies and methods of treatment that were recommended appeared to have so little influence upon the course and duration of these neoplasmic boils, that a great many if not the majority of the earliest, most experienced observers, recommend a policy of simple observation, combined with strict attention to cleanliness and other hygienic measures. The natives of the countries in which this disease prevails do not treat it systematically, and the superstitious practices to which they subject themselves in some localities can not be classed in the category of therapeutic measures. The inhabitants of the Zab-Oasis eat dog flesh, but the natives of Biskra wash the ulcers frequently with the foam of a coarse, alkaline soap—black soap (De Méricourt). As a rule, the ulcers are washed frequently, and the native treatment is in reality more hygienic than otherwise. It is a general belief, which is deeply rooted among the natives, that serious disorders would result from interference with the natural course of the disease (Barrallier). In consequence of this notion European physicians are rarely called to treat it. Volney, in 1787, writes, "The best remedy for this disease is not to apply any." Sucquet, writing later on, stated that "caustics and incisions resorted to by some physicians result in nothing more than an extension of the ulcer, in interfering with the healing and in the production of deeper cicatrices." Weber, who was one of the first to believe in the parasitic nature of these boils or *boutons*, insisted that the problem of the cure would be solved by the discovery of a suitable parasiticide, and it can not be doubted that the systematic local application of this class of remedies has proved of decided value. The disease has been shortened apparently by the use of the emplastrum de Vigo (Brocq); the emplastrum of minium and cinnabrium (E. Vidal), and frictions with an ointment containing forty per cent iodochloride of mercury (L. Bard). Hickman (India) praises iodoform, tincture of iodine, and sublimate solutions. The more severe methods of local treatment should be reserved for rebellious cases, and in this class of remedies we would include cauterizations with the actual cautery (Bovinet and Deperet, Hickman, Murray, etc.), or with nitric acid, or with Vienna paste, or solid stick of nitrate of silver plunged into the center of the tumors.

Of these methods, complete cauterization of the mass with the Paquelin cautery, as suggested by Crocker, should prove to be one of the simplest and most expeditious methods of effecting the destruction of the neoplastic infiltrate as well as the pathogenic micro-organisms.

It may be necessary to repeat the application several times, and the ulcer should then be treated on ordinary principles, as it will soon assume a healthy appearance and rapidly heal. The best time to act with caustics, especially the actual cautery, is in the early stage, when the disease is recognized in the form of a small, flat, reddish-brown growth in the skin (period of formation). Nevertheless, the effort to abbreviate the course of the disease by transforming the specific lesion into an ordinary non-specific ulcer should be attempted in all active stages.

When the eruptions are discrete—as, for instance, in the so-called "male" *boutons* of Biskra—there should be no objection to the total surgical extirpation of the neoplasmic area, the remaining wound to be sutured or covered over with Thiersch's, or Wolfe's, or sliding grafts.

The general condition should always be carefully considered, and all hygienic, dietetic, and therapeutic measures that could tend to improve the tone of the organism should be employed.

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TROPICAL PHAGEDENIC ULCER. (PRINCE A. MORROW.)

Synonyms: Phagedæna Tropica; Malabar Ulcer; Aden Ulcer; Fr., l'Ulcère Phagédénique; l'Ulcère Annamite.

Definition.—A phagedenic ulcer, peculiar to tropical climates, having for its point of departure any accidental lesion of the skin, characterized by rapid extension, with gangrenous destruction of the tissues.

It is met with in all tropical countries—in Asia, Africa, Central America, the West Indies, and even in the more temperate climates of Algiers and Egypt. It is more common in low, swampy, malarial regions.

Symptomatology.—The phagedenic ulcer almost invariably has its origin in some slight breach of continuity of the skin, from the sting of insects, an accidental scratch, or other traumatism, which becomes infected, presumably by a specific microbe, producing a papule or pustule, from which as a center the phagedenic process rapidly spreads. The feet and ankles are the almost invariable seat of the ulcers, although they may occur upon the hands and forearms, and exceptionally over other portions of the body. Authors describe a mild and a malignant form of the disease.

In the *mild form*, the parts surrounding the initial pustule become red, swollen, and painful, and, excoriated by scratching, give exit to a sanious purulent discharge, often chocolate-colored from the admixture of blood. The œdematous, infiltrated tissues rapidly become the seat of a sort of molecular gangrene, and are converted into a pultaceous, grayish or blackish slough, which slowly disintegrates, leaving an ulcer with perpendicular or undermined borders, from the base of which a sanious pus is abundantly secreted. After a certain time the inflammatory phenomena subside, and the borders of the ulcer become hard and callous, presenting the appearance of the ordinary chronic ulcer. In this atonic condition it may remain for weeks or months before cicatrization takes place.

The *malignant form* is characterized by a more rapid invasion and extension of the phagedenic process. In two or three days the affected surface is occupied by an ashen-gray slough, formed by the *débris* of the sphacelated cellular tissues, which mortify *en masse*. The surrounding infiltrated tissues in turn become the seat of the gangrenous process, and there is rapid extension of the ulceration both in area and depth. The skin and subcutaneous tissues rapidly disappear, the tendinous structures are exposed, the vessels and nerves destroyed, the articular cavities opened, and even the bones are involved in the necrobiotic process.

Pathology.—Boinet, who has made a most exhaustive clinical and bacteriological study of six hundred and fifteen cases observed at Tonkin, believes that the pathogenetic agent is a microbe which inhabits the mud and waters of infected districts. He asserts that the pus of the phagedenic ulcer is inoculable, and claims to have discovered a specific microbe, which he has cultivated and inoculated successfully into animals.

Etiology.—Although the disease is chiefly met with in the natives of tropical countries, it also attacks Europeans who sojourn in hot climates and are exposed to the exciting causes. Physical exhaustion from exposure, overwork, or famine are favoring factors. The malignant form is especially liable to occur in the debilitated, the anæmic, and those suffering from malarial cachexia.

Treatment.—The principal indications of treatment are rest, nutritious food, quinine, and tonics to combat the malaria and anæmia. Parke, surgeon to the Emin Pasha relief expedition, states that "as soon as the opportunity was furnished by rest and good food, the ulcers of all those whose systems had not been wholly undermined by the hardships to which they had been exposed healed up rather rapidly and completely under simple treatment."

The local treatment of the phagedenic ulcer will vary according to the form and stage of the disorder. To arrest the phagedenism, scraping, the actual cautery, and various caustics are recommended, to be followed by borated or salicylated dressings, powdered iodoform, etc. Parke obtained excellent results from the use of pure carbolic acid, which left a healthy granulating surface when the slough separated. In the milder form an ordinary antiseptic dressing, such as a solution of permanganate of potash or sublimate, has been found sufficient to effect a cure.

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CLASS VI.—NEUROSES.

(EDWARD BENNET BRONSON.)

MOST writers on skin diseases have found it convenient to make a separate class of such neurotic affections as consist merely in disturbances of sensation without obvious structural change in the skin. A few writers include also in the same division motory disturbances—notably Auspitz, who designated the class as "idioneuroses," neuroses pure and simple. Clearly it might easily be extended to include secretory and vascular anomalies dependent on neuropathic conditions and not associated with trophic change. Here, under neuroses of the skin, will be considered only those anomalies that concern the sensory nerves, including, beside those that are purely sensory, those in which a sensory disturbance is combined with a motory. To these latter belong more particularly the affections embraced under the common designation *urticaria.*

SENSORY NEUROSES.

The cutaneous æsthesis may be abnormal either through excess, defect, or perversion of sensation, corresponding to which we have the morbid states of hyperæsthesia, anæsthesia, and paræsthesia, which would be a perfectly simple and definite division were there but a single sense concerned; while in point of fact the senses of the skin are multiple, and in morbid conditions may not all be affected alike.

First of all there is that primordial sense known as *common sensation*, which is mere subjective feeling with more or less consciousness of some change occurring in the part concerned, together with the incidental concomitants of physical pleasure or physical pain. Its independence of the perceptive senses is evidenced in various clinical facts. Thus anæsthesia of the special senses may be attended with sensations of pain, as in the so-called anæsthesia dolorosa, or analgesia may coexist with normal æsthesis of the tactile and caloric sensibilities.

Not very far removed, probably, from common sensation is the *sense of temperature*, but nevertheless a sense quite distinct from it, as it also is from other tactile sensations. Of all of them it seems to be the most constant, for though subject to its own variations, being often affected by hyperæsthesia or paræsthesia independently of other sensations, it is said to be the last to succumb to anæsthesia superinduced by organic nervous disease. Its independent character has further been demonstrated by the discovery of special temperature areas of the skin, which are distinct from the tactile areas. The temperature impressions afforded by different objects with which the skin comes in contact have much to do, unquestionably, with the perceptions of the tactile sense.

In a more restricted significance, what we commonly understand by tactile sense has been defined as pressure sense. It adds but little to our conception of it, and with almost the same propriety the term might be applied to other and totally dissimilar senses, such, for example, as that of hearing. To evoke the perception of form and quality in the object touched, a certain definite degree of pressure is requisite; and with this fact in view the term *pressure sense* might be employed for that kind of touch that gives definite presentations to consciousness. But apart from this there is a *sense of contact* which may be regarded as the threshold of the perceptive sense, but is nevertheless but one remove from common sensation. It undoubtedly gives some intimation of an external object, and in that respect differs from the merely subjective impressions of common sensation. Though no pressure be recognized, there must be, even in the slightest contact that can be felt, some movement imparted to the peripheral nerves, effecting some molecular change. There is reason to believe that this primitive sense of contact is the one most subject to disturbance in the sensory anomalies of the skin. It is proper, therefore, to make a distinction between this sense of the skin and that highly specialized endowment of cutaneous sensation which ranks with the special senses of sight, hearing, and smell, and which, like these latter, is undoubtedly provided with its own special organs—the so-called organs of re-enforcement. For this special sense of the skin a more appropriate designation is needed than sense of touch or tactile sense. In a recent paper On the Sensation of Itching (Medical Record, October 18, 1890) it was proposed by the writer to designate it as the *sense of pselaphesia.* The word *pselaphesia* had heretofore only been used in composition, as in apselaphesia or hypopselaphesia, but without a strictly defined meaning. The Greek word ψελάφησις (from ψέλαφâν, to feel or to grope for a thing as a blind man or as one in the dark) implies something more than simply touching. It signifies rather feeling for or of a thing. If I feel in my pocket for some object, as a knife or a coin, I call into play the act and the sense of pselaphesia, not merely the act of touching and sense of contact. The sense of pselaphesia not only implies something more than sense of contact, but probably also includes or is closely associated with the temperature sense, and in its higher operations is assisted by the muscular sense. Any one of these associated senses being lost or impaired, the sense of pselaphesia suffers.

Bearing in mind that the æsthesis of the skin is made up of these distinct elements, we may proceed to consider its anomalies according as the condition is one of excess, impairment, or perversion, under the three heads Hyperæsthesiæ, Anæsthesiæ, and Paræsthesiæ.

HYPERÆSTHESIÆ.

By the term *hyperæsthesia* as commonly employed is meant a condition of excessive sensibility rather than excess of sensation. Thus any abnormal sensation when arising through an unusual irritability of the skin is called hyperæsthetic, while the same sensation arising spontaneously would not be regarded as a hyperæsthesia, but rather as a paræsthesia. The fact should be borne in mind, however, that many if not most of the paræsthesiæ of the skin are more or less complicated with a condition of excessive cutaneous irritability—i. e., hyperæsthesia. Moreover, such irritability may respond not only to external or mechanical excitations, but also to subjective or mental influences, constituting what is known as psychosensory hyperæsthesia.

It is not always the same kind of sensation that is involved in a state of hyperæsthesia. As already intimated, it is the lower forms of sensation—those not very far removed from the primitive common sensation—that are the most subject to derangement. Under certain circumstances, though of comparatively rare occurrence, there may be hyperæsthesia of the special perceptive sense, the sense of pselaphesia. It has been observed in persons of highly nervous organization, in hysteria, and in the hypnotic state. It has been stated that under such conditions the points of the æsthesiometer could be distinguished separately at smaller than the average distances at which it would be possible to distinguish them as two points.

Much more common is an excessive irritability of the sense of contact. The lightest impacts upon the surface of the skin are felt with abnormal acuteness, and simple contacts cause the patient to shudder or shrink away from the touching object. It occurs in various neurotic conditions, whether inherited or acquired. It is common in hysteria, in tetanus, neuritis, and in connection with various organic diseases of the nervous system. It may be a temporary condition incidental to states of emotional excitement, and is occasionally observed in intoxication. It is sometimes present during the early stage of lepra anæsthetica.

So closely related is this sense of contact to the simplest form of sensation that when in a state of exaltation the effects produced are often hard to distinguish from disturbances of common sensation. But in the former there is always the intimation clearly presented to consciousness of an impact with the surface—the perception of something touched. That supersensitiveness of the skin that is known as hyperalgesia, however much it may incidentally include hyperæsthesia of the contact sense, is essentially something apart and independent. It has been noted in connection with tabes dorsalis that hyperalgesia may be associated with a normal or impaired sense of contact.

Likewise there may be an independent hyperæsthesia of temperature sense. In neuralgia or neuritis there is often an excessive sensitiveness to cold, and the same is said to be true of patients suffering with posterior spinal sclerosis. Morbid sensitiveness to heat is said to be less common. The heat sensations occurring spontaneously or as mere subjective phenomena belong to the paræsthesiæ.

ANÆSTHESIÆ.

As is the case in hyperæsthesia, in anæsthesia or hypæsthesia the whole sensibility of the skin may be lost or impaired or only certain of its component elements. But, contrary to the rule obtaining in hyperæsthetic conditions of the skin—viz., that the sense of pselaphesia is the one least apt to be affected where cutaneous sensibility is impaired at all—it is this more highly specialized sense that most commonly suffers. Analgesia, however, is frequently present without the sense of touch being affected, as, for example, at a certain period of artificial anæsthesia. Moreover, the sense of contact may be dulled without the higher sense being absolutely impaired, though its impressions may be slower in developing. Thus in numbness of the skin, produced either by cold, pressure on a nerve, or by the action of aconite, the contact sense is evidently impaired, and yet at the same time the higher tactile sensibility may be fairly good. Under certain circumstances the presentments to consciousness of tactile impressions may be retarded through psychic causes, as in melancholia or in dementia. Whether the comparative slowness of these perceptions in old age is owing to conditions that are central or peripheral, or both, is uncertain. In certain skin diseases attended with marked sensory disturbance there may be dullness of the sense of pselaphesia. Such is said to be the case in eczema more especially of the neurotic type. In syringomyelia the loss of sensibility over the affected areas may affect only the sensations of pain and temperature, the tactile sense remaining unaffected, and this is also sometimes observed in the anæsthetic areas of leprosy. In syringomyelia the application of a cold or hot body to the surface may give rise to a sensation of pain without producing any impression of temperature. In other cases of partial anæsthesia—as, for example, in posterior spinal sclerosis—the sensations of heat and cold are transposed, so that a hot body seems cold to the touch and *vice versa*. Such a condition, however, belongs more properly under the following head:

PARÆSTHESIÆ.

These are perversions of sensibility in which the sensation following any irritation or stimulus differs in kind from that which would normally be produced under similar circumstances. The paræsthesiæ of the skin include a vast number of such perversions. They always imply nervous disease, whether symptomatic or idiopathic, and may be due either to disorders at the nerve centers or at the peripheral extremities of the nerves in the skin.

As in other forms of morbid æsthesis of the skin, paræsthesia may affect one or all of the elementary divisions of sensation. The higher tactile sense may be perverted so as to give false impressions of objects touched. A hard body may seem soft, a smooth rough, and so on. An allied condition is the perversion of the sense of localization, as in the condition of allochiria, where the impressions produced by touch are correct enough, but referred to the wrong side of the body. A similar condition has been described by Bulkley, where mechanical irritation at some particular part is associated with a sensation of pricking at some point far removed from the site of primary irritation.

Perversions of the thermal sense are not uncommon. Reference has already been made to the transposed sensations of heat and cold. Sometimes, without contact or any change in temperature that would be ordinarily noticeable, this sense becomes greatly stimulated. Such conditions are known as *algor* and *ardor*. Under the name *causalgia* Weir Mitchell has described a peculiar burning pain as though from application of a hot iron, occurring in connection with "glossy skin."

Most of the paræsthesiæ of the skin concern sensibilities which are of a low order. They may be purely of a subjective character, involving only what we know as common sensation. To these belong more particularly the paræsthesiæ of pain, of titillation, and of numbness—sensations which, though in as sharp contrast with each other as minus, plus, and zero, are all purely negative so far as they relate to objective perceptions. They have already been referred to in connection with hyperæsthesia and anæsthesia. They become paræsthesiæ by an arbitrary classification when they occur spontaneously or without obvious structural lesion; but in both cases the morbid sensation is the same.

DERMATALGIA.

The painful paræsthesia of the skin is known as *neuralgia cutis*, or *dermatalgia.* It is distinguished from hyperalgesia inasmuch as the pain occurs without noticeable contact with the skin, though almost always hyperæsthesia of the surface is associated with it. Moreover, it is usually limited to circumscribed areas. It occurs as a symptom of hysteria, and also in connection with certain organic diseases of the nervous system, notably in tabes dorsalis. It is also sometimes an effect of arthritism, and on this account has been called "rheumatism of the skin." It is more apt to affect the hairy regions of the body, more particularly the scalp. Women are more frequently sufferers from it than men. It is said by Hyde to be not infrequent at the time of the menopause.

PRURITUS.

There is another form of paræsthesia of the skin which appears to occupy an intermediate position, so far as its sensations are concerned, between the sense of pselaphesia and common sensation. The sensations are not purely subjective, nor do they afford to consciousness any definite perceptions of any external objects, and yet they constantly convey the impression of some foreign body, or of something in contact with the skin—an impression that, not being clearly interpreted in the sensorium, gives rise sooner or later to a sense of uneasiness and nervous fret. It is variously described as a picking, prickling, stinging, or crawling sensation. With it is always associated the impulse to scratch or rub the affected surface. It is that most common of all the abnormal sensations of the skin, the sensation of itching, or pruritus.

The sensation of itching is attended with greater perturbation in the sensorium than are the normal operations of the more highly specialized sense, upon the general principle that where incident forces, acting on the body, are not immediately converted into some normal vital function of the part involved, they inevitably cause derangement or disintegration. A tactile impression that engages the cutaneous "organs of re-enforcement" is transmitted directly to consciousness, where all its energy is converted into a definite cognition. It is said of the sensations of pain that they pass into the gray tracts of the spinal cord, where their further progress is arrested; while tactile sensations (i. e., the sensations of pselaphesia) traverse the less resisting white tracts and thence pass directly to the brain (Funke). Applying this doctrine to the sensation of itching, which is more nearly allied to common sensation than is the sense of pselaphesia, and is probably due to conditions in the nervous system similar to those which cause pain, we can readily see how the perturbation attending it may be due to the reaction of obstructed nerve energy. The portion of the nervous apparatus which is primarily the recipient of the tactile impressions in itching, and upon which the accumulated excitation reacts, is with little doubt those primitive and but slightly differentiated nerve endings (situated, perhaps, in the epidermis) that still remain as they were at a very early period in the course of evolution the simple organs through which is effected the sense of contact. The process is doubtless the same, whether the pruritus be provoked artificially by external contact or is the result of interior excitations, either developed through changes in the skin, such as are incident to certain cutaneous diseases, or through disturbances at the nervous centers. The only form with which we are concerned here is that which occurs purely as a neurosis and independently of any essential trophic change in the skin. It is this form which commonly has received the indefinite name *pruritus cutaneus*, but is better designated as

Pruritus Essentialis.—By this term is implied a neuropathic disease, of which itching is the essential and most important factor; and though trophic changes in the skin may be associated with it, they are purely secondary features. But it may with truth be said that pruritus is itself a secondary condition. Any paræsthesia, such as pruritus is, must be secondary to some more general anomaly of the nervous system. But by pruritus essentialis we mean the entire morbid process of which the itching is the necessary consequence. To trace the connection of cause and effect in the disease is possible only approximately. In many cases the cause can only be conjectured. The most we can do is to state in a general way the conditions that bear to it a causative relation.

Etiology.—Of the general conditions that act as *predisposing causes* of pruritus, whether it occur as an essential disease or is predominated by some other disease of which it is a symptom, by far the most important is *hyperæsthesia.* As has already been intimated, cutaneous hyperæsthesia is less apt to affect the higher sensibility of the skin than the common sensation, or that intermediate phase which concerns the primitive sense of contact; indeed, sensations involving this primitive sense, such as numbness, "pins and needles," formication, and itching, are not infrequently associated with a condition of hypopselaphesia. Thus it has been demonstrated by the æsthesiometer in certain essentially pruriginous diseases—for example, neurotic eczema—that this association actually exists.

The hyperæsthesia that predisposes to pruritus may be either congenital or acquired, and it may be either local or general. Occurring as an innate quality of the sensory nerves, it accounts for the itchy skins so often observed in neurotic subjects, especially children. In prurigo we see it limited to certain areas of the body. It may be acquired through diseases that affect the economy at large, or that are localized in the skin.

The general diseases producing it may be idiopathic neuroses, such as hysteria or hypochondriasis and other affections of the nervous centers, or general nutritive diseases affecting the nervous system secondarily, such as arthritism or diabetes mellitus. In all of the cases the primary effect of the general disease is simply to greatly heighten the susceptibility of the peripheral nerves, causing exaggerated sensations from the slightest contacts. The greater the excess of sensation and the slighter the contact, the less apt are they to engage the relieving sense of pselaphesia and the more apt to evoke the dysæsthesia of pruritus.

A precisely similar hyperæsthesia may be the consequence of prolonged irritative changes in the skin. In the so-called pruriginous diseases which are attended with trophic changes—such as eczema, lichen, pemphigus, scabies, and the like—the itching is chiefly due to direct interference with involved sensory nerves, more particularly those in the epidermis; but when the irritation has been long continued the nerves become hyperæsthetic and the pruritus unduly exaggerated. We see this often in overtreated cases of scabies. Sometimes, however, the hyperæsthesia plays a more important part. In some cases of eczema, for example, the itching is the paramount symptom, which from the start is in excesss of what could be easily accounted for by the inflammatory changes. Often, indeed, it is evident that but for this symptom the catarrhal disease would disappear or be insignificant, or perhaps never have occurred at all.

If that form of hyperæsthesia which is the most common predisposing cause of pruritus be seldom or never associated with hyperpselaphesia, but rather with its opposite condition, and granting that pruritus is a form of dysæsthesia the very essence of which is imperfect conduction of sensory impressions, it would seem fair to regard *hypopselaphesia* as a condition favorable to pruritus—i. e., as potentially a predisposing cause. Partial anæsthesia of the cutaneous surface is not infrequently accompanied with a tendency to itching or allied disturbances of the contact sense. The itching that sometimes occurs as an effect of the action of certain narcotic drugs, such as chloral, opium, belladonna, and aconite, may in part be due to the impairment of cutaneous sensibility. Similarly, in certain atrophic conditions of the skin, the pruritus attending them is not improbably closely connected with damage done the sensory nerves, which impairs their facility for conducting tactile impressions. Itching of the skin is often observed in alcoholics, especially just after cessation or during temporary intermissions of the customary stimulation. The degenerative effect of alcohol upon the nerves and upon the skin is well known. A similar degeneration takes place in the skin of the aged. While not ignoring the various other conditions that bear important parts in the etiology of pruritus senilis, it would seem that among the predisposing causes a very important factor to be taken into consideration is the coexisting hypopselaphesia.

The *exciting causes* of pruritus consist of irritations that may be either indirect and conveyed to the skin from the interior of the body, or direct, in which case the excitation is produced by local irritants, whether arising from extraneous sources or from sources that are intracutaneous.

Irritations transmitted from the interior to the surface are doubtless much more apt to be predisposing than exciting causes of pruritus. The latter then arises only when some external contact or excitant is superadded. But the sensation may also be the direct expression in the skin of a disturbance at the nervous centers. No better evidence of this is needed than the effect commonly produced on the sensations of a medical class when an interesting case of pediculi vestimentorum is presented before it. In this instance the provoking disturbance is a psychic one, and yet the sensations evoked have all the reality of veritable contacts.

Sympathetic or "reflex" irritation accounts for many cases, as, for example, those of pruritus ani from ascarides in the rectum, from internal hæmorrhoids, or from urethral stricture; pruritus vulvæ from disorders of the internal genitals; or for cases of more generalized pruritus, such as that sometimes observed during gestation, or accompanying other uterine disturbances, or that may attend derangements and diseases of the organs of digestion. Such was an extremely severe case of general pruritus recently observed associated with carcinoma of the stomach.

Of like character are the instances of sympathy between different regions of the cutaneous surface in pruritus. No sooner is one part irritated than others remote from it are affected by the same sensation. This is especially marked in urticaria. In hyperæsthetic conditions, when an itchy place is scratched the sensation seems either to precede the hand like an advancing wave or suddenly skips to distant points.

The external irritants that may act as exciting causes of itching comprise not only every imaginable form of tangible contact with the exterior of the skin, but also changes of temperature. When the pruritic effect is an exaggerated one, when it is disproportionate in degree to the provoking cause, it must be regarded as a paræsthesia, and is practically the pruritus essentialis we are considering. It always presupposes a condition of hyperæsthesia or of hypopselaphesia.

The intracutaneous irritants include various local disturbances of growth or of nutrition. Lesions of trophic cutaneous diseases, or their products, may, through constriction, pressure, or other embarrassment of the nervous apparatus in the skin, provoke the pruritic paræsthesia. Peripheral degeneration of the nerves may attend these diseases. Simple nutritive disturbances without trophic change may, through derangement of the normal metabolism or in other ways, disorder the molecular constitution of the sensory nerves so as to produce the sensation of itching. Perhaps the commonest and most important of these disturbances is simple hyperæmia. Given the predisposing cause, this disturbance of the blood-vessels seldom fails to evoke the morbid sensation. Again, the circulation of abnormally constituted blood may be a direct exciting cause, especially if it contain noxious materials that are conveyed to and deposited in the skin. Thus is explained the pruritus that attends icterus and the itching that often is associated with glycæmia and uræmia. When toxicants that cause irritations of the skin have been ingested, their first effect is usually exhibited upon the digestive apparatus, and the cutaneous effect is secondary, the result of reflected irritation. But it is possible also that the irritating substances in process of elimination may be brought directly to the skin and there produce sensory disturbance like any topical irritant.

In a recent paper (Etiology of Itching, Medical Record, October 24, 1891) by the writer it was contended that among the excitants of itching should be considered, at least as a contributory factor, hyperkinesis, or spastic contraction of the arrectores pilorum muscles. The argument there stated is briefly as follows: It is well known that contractions of these muscles occur in stimulation not only of the temperature sense but also of the contact sense. With or without the development of pronounced cutis anserina, they occur both from exposure to cold and from titillation of the sensitive hairs. The condition of "goose flesh" is most commonly associated with exposure to cold, and generally the only sense concerned is the temperature sense. The erection of the hairs and contraction of the skin accompanying it tend to approximate the hairs nearer together. In lower animals with hairy covering the effect of this action is to more effectually cover and protect the surface from cold. But this is not its only purpose. Bristling of the hairs, as much as erect ears, denotes alertness and vigilance for defense. Each hair is, to a certain degree, an organ of sense, and that it may be used to its fullest advantage it is erected and projected, as far as possible, to guard the animal at every point of its environment. In men the hairs are but analogues, but they retain the same properties that once gave their possessors certain advantages of defense. Horrida cutis is still the natural concomitant of shuddering, and hairs standing on end are the common signal of alarm or sudden fright. Itching is not usually associated with these contractions of the cutaneous muscles unless the sense of contact is fairly engaged, unless the excited hairs touch something, and then only when the sense is vexed and fretted. But it is a fact that spasmodic muscular contractions may be produced by instinctive apprehension of an offensive contact. It only requires a state of hyperæsthesia to convert this apprehension into a fancied realization. It is hardly presuming too much, then, to suppose that, given a hyperæsthetic condition of the skin, the existence of spasm of the arrectores, from whatever source it may arise, would suffice to evoke by suggestion the very same nervous impressions that are commonly and instinctively associated with it when the result of external contacts (Etiology of Itching).

To fully appreciate the effect of spasm of the arrectores pilorum we should bear in mind the intimate connection of these muscles with the highly sensitive external root sheaths of the hairs on the one hand, and with the under surface of the epidermis on the other. Situated as they are, their contraction could hardly fail to create more or less commotion in the sensory nerves of the adjacent portions of the rete, and especially in conditions of hyperæsthesia. From this point of view the hypertrophy of these muscles that is so often found in connection with various pruriginous diseases gains a far more satisfactory explanation than that which would regard it as nothing more than a product of inflammatory changes. And while chiefly an effect of the pruritus, it becomes also a contributory factor in the etiology, much in the same way as a contracture of voluntary muscles may be both effect and cause in relation to the sensation of pain.

Clinical Forms of Pruritus Essentialis.—Considering the number and complexity of the causes of this disease, it is evident that its clinical forms must be of infinite variety. Certain of them, however, recur so frequently and have such definite characters as to merit a separate consideration, if not to be regarded as independent forms of disease.

The distinction is sometimes made between generalized pruritus (pruritus universalis) and localized forms. But the former rarely affects more than a portion of the general surface at one time, and, moreover, the same general conditions that under certain circumstances give rise to the generalized form may under different circumstances produce one of the local forms. This is especially true of that variety of essential pruritus that occurs as the consequence of a central neurosis. Though apt to be distributed generally over the body, it may locate itself in some particular spot or region. Such essentially neurotic forms of pruritus are sometimes observed in hypochondriasis and in hysteria. In this connection should be mentioned a special psychic form attended often with hallucinations, the patient imagining himself infested with vermin. It usually occurs in nervous, sensitive subjects, and often follows the discovery at some time of a few pediculi upon the person. The apprehension that some may be still left, even after the most thorough treatment, can not be eradicated. It often leads to the most distressing state of mind, and is always accompanied with the liveliest sensations of itching. Nothing will convince the patient that the creatures are not there. He will declare he has seen them move, or even watched them in the act of emerging from the pores of the skin. In a case of this sort, occurring in a lady, the patient would often display to the physician little rounded or spindle-shaped bodies preserved in a box, and which had been alive, he was assured, when first captured, but that on examination proved to be merely *débris* of epidermis and other matters that had been scraped from the skin. In this case the mental derangement seemed to be entirely removed by antipruritic measures combined with general treatment. But the condition is often a serious one, tending to melancholia or insanity.

Among the more generalized forms of essential pruritus are two that are definitely related to age and two to season. Of the first two, one is the pruritus of the aged (pruritus senilis); the other begins early in life, and might be distinguished as the congenital form. It is the prurigo of Hebra. Pruritus hiemalis and pruritus æstivalis are the forms relating to season.

Pruritus Senilis.—Pruritus is especially common among the aged, but it is hardly a sufficient diagnosis, whenever a person of advanced years complains of itching that is persistent and without any very obvious cause, to simply call it "senile." A large proportion of the causes which we have enumerated above under Etiology are especially apt to be in force at an advanced period of life, and many of the forms of pruritus that affect the aged do not differ in nature from what might occur at earlier periods. Arthritism under its various forms, Bright's disease, diabetes, and other degenerative diseases are notably common in old age. Many of the causes are incidental and more or less general effects of the senile decay, such as the imperfect action of the emunctories, hepatic derangements, the circulation in the skin of imperfect products of oxidation, defective metabolism, most of which, however, are only phases of the general diathetic condition known as arthritism. Properly the term *senile pruritus* should only apply to what is a consequence of changes, nutritive or structural, that are peculiar to old age. It has been regarded as due to atrophic degeneration of the cutaneous nerves, and, like alopecia senilis, is supposed to be a direct effect of decay in the skin. Such a supposition is not unreasonable. It is a well-known fact that in old age all the elements of the skin undergo atrophic changes. As a general effect of the senile marasmus, all the special senses become more or less obtunded. Granting the relation of pruritus to hypopselaphesia, already referred to above, it is easy to see why the conditions in senile decay are favorable to the occurrence of itching. With little doubt, however, there are also senile atrophic changes at the nerve centers which play an important part in the etiology, and perhaps more important than those at the periphery.

The diagnosis of pruritus senilis must therefore be made wholly by exclusion. Persistent general itching of the skin in a person of advanced age, whose skin shows no adequate inflammatory lesions to account for it, who is neither gouty nor rheumatic, who has no symptoms of special internal disease, is not an alcoholic, and in whom there is no reason to suspect the presence of pediculi, may fairly be regarded as a case of pruritus senilis.

Prurigo.—This disease, though allotted to another division of this work (*vide* p. 224), should, it has seemed to the writer, for the sake of consistency and completeness, be alluded to here. Prurigo is generally regarded as a trophoneurosis. The trophic element consists of an inflammatory papule, which, however, is not always present, is not therefore essential to the disease, and, moreover, what appears to be identically the same lesion may be found sometimes in other pruriginous affections. Apparently it would seem to be a secondary effect and a result of the scratching. It was so regarded by Auspitz, who considers the disease to be a combination of a sensory and motory neurosis. The inception of the prurigo papule he believes to be an effect of spasm of the arrectores pilorum muscles. The motory implication is clearly in evidence, at least at the earlier stages of the disease, where often urticarial lesions are the only ones present. At all events, at all stages of the disease the severity of the itching is out of proportion to any apparent eruption of so-called prurigo papules. The disease is primarily and essentially a sensory neurosis—a neurosis that is usually congenital, and whatever lesions may develop secondarily render it none the less a pruritus essentialis.

Pruritus Hiemalis.—This affection, which is also known as "winter" or "frost itch," since Duhring first described it, has been generally recognized as a well-characterized and independent form of disease. It is by no means rare. In its lighter forms a large proportion of the population are sufferers from it in greater or less degree every fall. The severer cases may continue all winter, but usually by the time the cold season has become fairly established the trouble has disappeared. With the first cold days of autumn its manifestations begin. The itching is always greatly aggravated toward night. Though this is more or less characteristic of all forms of itching, it is especially so of pruritus hiemalis. Often it does not begin until on disrobing at night, and will then continue for several hours, robbing the patient of his sleep for more or less of the night. The most common location of the itching is the lower extremities, but it often affects the arms, and sometimes the body. Surfaces habitually exposed are rarely affected. It is said by Duhring to affect the nonhairy parts more than others; for example, the region of the ankles and the inner surfaces of the thighs. But it has seemed to me to be equally or rather more common along the outer aspects of the legs and the calves. Indeed, I have sometimes seen it occupying identically the regions implicated in prurigo—the extensor surfaces of the legs and arms. It has no characteristic lesion. The most that can be seen is an appearance of "goose flesh" during the paroxysms of itching, and hyperæmia or secondary lesions, the result of scratching. At times among these I have met with pale papular elevations that in a well-marked case of prurigo would easily pass for the so-called pathognomonic lesions of that disease. It is evidently a hyperæsthetic condition of the skin in which disturbance of the sense of temperature is an essential feature, and, furthermore, I can not but regard hyperkinesis of the arrectores pilorum as one of the important factors in its causation. The disease appears to be only an exaggeration of that disturbance of the cutaneous sensibility experienced by nearly every one on removing the clothing in a cool atmosphere, especially when retiring at night. First comes the sensation of coolness, then with the gradually developed cutis anserina comes the desire to scratch. Of the precise nature of the *pruritus æstivalis* of Hutchinson little can be said. At least, a pruritus that is peculiar to summer and not a concomitant of "prickly heat" has not been generally recognized in this country.

Sometimes from special neuropathic causes an essential pruritus may remain limited to some particular region. Thus there have been described a *pruritus palmæ et plantæ*, a *pruritus linguæ*, and occasionally the itching occurs along the course of a particular nerve, but the regions most commonly affected are the genital and anal.

Pruritus Progenitalis.—Persistent itching of the external genitals is not uncommon either in the male or in the female. In the male it is usually the scrotum which is the chief seat of the trouble. When it extends to the perinæum, as it frequently does, or to the penis, which is not so common, it is usually because aggravated by a concomitant eczema. It is maintained by some that pruritus of the scrotum is rare except as produced by eczema. The converse I believe to be more nearly true—namely, that a chronic and persistent eczema of this part is rare except as a consequence of pruritus scroti. In most cases, then, where there is itching extending over a long period in this situation the primary disease is a pruritus essentialis, whether conjoined with catarrhal manifestations or not. The same may be said both of *pruritus vulvæ* and of *pruritus ani.*

Pruritus Vulvæ is most apt to affect the labia majora, which correspond in general character to the scrotum in the male. More rarely it affects the labia minora or introitus, and still more rarely the vicinity of the clitoris. But in the severer cases, however, all these parts become involved. Sometimes the pruritus seems to extend up into the vagina and down on to the thighs. The patient may in the intenser forms become almost frenzied by the paroxysms of intolerable itching. She is absolutely powerless to resist the impulse to rub and scratch the parts, with results that may become disastrous, both morally and physically. Altogether pruritus progenitalis in the female is far more serious than in the male, and yet their etiology is very similar. In both, reflex irritation is often the chief cause. In the female a leucorrhœal discharge has sometimes been accused of causing the irritation. While such a discharge might give rise to erythema, erosions, or eczema, it is difficult to see how it could become directly the excitant of pruritus. In both sexes the disturbance is most apt to be due to a localized neurosis, which may as well be the expression of a generalized morbid condition of the economy, such as exists in arthritism as the result of some disturbance in the neighboring organs. Such general conditions, it is true, often tend to vitiate the local secretions which would naturally aggravate the trouble. Some of the severest cases of genital pruritus are associated with glycosuria. Where general causes are responsible there is always a primary condition of hyperæsthesia, to which the natural and particular irritability of these parts, together with their peculiar tendency to perverted sensations, renders them especially subject.

Pruritus Ani, it has been said, is often the result of hæmorrhoids, but it is doubtful if there is any more substantial ground for this than the fact that it is sometimes called "itching piles." It is often due to irritations reflected from the rectum or regions higher up, or possibly from a strictured urethra, but is much more apt to be associated with those general conditions mentioned above. The appearance of the anus in this affection is characteristic. It has a whitish sodden look that is usually accompanied with a foul-smelling secretion. The folds are swollen and the furrows deepened. Often the effect of scratching is to complicate it with eczema. It is one of the most distressing forms of the disease.

Treatment.—For the management of the general conditions of hyperæsthesia and anæsthesia we must refer to the text-books on nervous diseases. We have only considered them above so far as they have a bearing upon certain paræsthesiæ of the skin which especially concern the dermatologist. The only purely sensory neuroses that we are apt to be called upon to treat as skin diseases are dermatalgia and pruritus essentialis.

Dermatalgia should in general be amenable to the same measures of treatment as the neuralgias generally, the only difference being that inasmuch as in this form the seat of the trouble is more superficial, it should be more readily affected by external remedies. Hot or ice-cold applications, sinapisms, blistering, chloroform, the menthol pencil, tincture of aconite, ointment of veratrine, camphor, and chloral mixture, to which morphine may be added, are some of the topical remedies that have proved themselves useful. In some cases galvanism has had a good effect. It may be necessary to resort to analgesics, such as phenacetine or antipyrine, or to such narcotics as opium, belladonna, or hyoscyamus. Of still greater importance than these which are addressed to the indicatio localis are remedies that may be suggested by the indicatio causalis. To the latter, in appropriate cases, belong quinine, salicylic acid or silicylate of soda, arsenic, and strychnine.

In the management of pruritus essentialis, as of any other disease, the first consideration should be directed to what causes the trouble. The adoption of measures tending to remove any accidental conditions through which pruritus may be occasioned is therefore important. Such causes include, besides various local sources of irritation, certain remote or general diseases, and furnish the *indicatio causalis* in its more limited sense. This, however, states the scope of the problem only partially. What is of most importance, first, is to establish principles of treatment fitted to those more special and more essential causes that constitute the necessary conditions of the disease, and whence we derive the *indicatio morbi.* These causes we have endeavored to trace above under Etiology, and it is they which afford the only intelligent basis for the therapeutics of pruritus.

We have seen first of all that the chief underlying condition in pruritus is hyperæsthesia, whether in its common signification of an excessive irritability of the sensory nerves, or in the sense of an excess or engorgement of sensation. The prime indications, then, are to allay irritability and to divert or annul the excess of nervous excitement. The natural impulse of every afflicted animal is to resort at once to what is the simplest mode of relief—namely, to divert the irritation or sensory engorgement by scratching. But while affording temporary relief, or relief that in ordinary or what may be termed physiological itching may be permanent, in morbid pruritus, in pruritus dependent on a pre-existing state of hyperæsthesia, the effect of this method is to augment the excitation in the aggregate, and this augmentation will almost surely be followed by another engorgement, with a greater access of the pruritic excitement. Furthermore, the resulting hyperæmia, itself a common exciting cause of itching, will probably do more than offset the temporary diversion that the scratching affords, and, besides this, the injury done the epidermis renders it each time more vulnerable and more sensitive to irritating contacts. Scratching is an abuse of what would *a priori* seem to be a rational method of treatment.

Should the morbid irritability which is the predisposing condition in pruritus essentialis be dependent upon some removable cause, the problem becomes a comparatively simple one. Thus if due to rheumatism or gout, especially when a recent effect, by the use of antirheumatic or antilithic remedies the hyperæsthesia may disappear and with it the pruritus. Similarly in appropriate cases cholagogues, purgatives, or diuretics might possibly suffice to effect a cure. But, as a rule, the hyperæsthetic tendency must be accepted as a necessary and more or less permanent condition, and the best we can do is to avoid or mitigate the consequences. As in all irritable conditions, the most important thing is to secure rest first by removing so far as possible all local excitants, and, that not sufficing, by the employment of calmants.

A. **Measures to remove Local Excitants.**—These will include, first of all, such as directly tend to prevent scratching. To admonish the patient to refrain from this is usually of little avail. Restraint may be possible during the waking hours, but at night, when the trouble is always at its worst, and especially during the state of somnolence midway between sleeping and waking, no will-power can prevent it. It can only be avoided by first mitigating the *besoin* through the aid of antipruritics. It is of some advantage, however, for the patient to know that relief may often be obtained through other tactile diversions than those which are effected by the sharp finger nails—as, for example, simply by firm pressure of the part or by stroking the itching surface with the finger pulps or with a soft cloth or brush (perhaps first lubricating the part with vaseline), using a little pressure but without rapid motion. Irritating contacts of all sorts should be most scrupulously avoided. Attention should be given to the underclothing. Woolen is rarely tolerated under these circumstances. The clothing next the skin should be of the softest material, of cotton, linen, or possibly silk. Of further importance is the avoidance of immoderate temperatures, whether of heat or cold, and especially of sudden changes, which are peculiarly apt to excite itching. The temperature of the surface should be kept as equable as possible.

The local excitants may not only be extracutaneous, but also intracutaneous. Often they are incidental to the trophic changes of one of the so-called pruriginous diseases, in which case the treatment of the pruritus is included in that of the disease of which the itching is a symptom. When they arise from toxic materials conveyed to the skin by the blood, we endeavor to eliminate these materials by depurative remedies, more especially diaphoretics and diuretics, while disturbances of the nerve terminals that are directly transmitted from the interior are best relieved by means of the substitutive irritants to be considered in a succeeding section (*D*).

These measures failing or proving insufficient to secure the desired rest, it becomes necessary, in pursuance of this object, to have recourse to certain sedatives. Some of these that are used internally are designed more particularly to neutralize the hyperæsthesia; others, including both internal and external remedies, serve rather to directly annul the pruritic excitement.

B. **Sedatives.**—When used internally, remedies of this class are apt to be disappointing. The degree of general sedation that is required to affect the nerves of the skin in so intense a disturbance as pruritus often is, affords a sufficient reason why this method of treatment is usually objectionable. Further than this, the depressing and atonic after-effect on the nervous system tends to exaggerate the general hyperæsthesia which is already essentially an atonic condition, and thereby increase the tendency to itching. Especially objectionable on this score are most of the narcotic sedatives. The bromides, on the other hand, are often indispensable and may be required in liberal doses. It is important to avoid the enervating effects of loss of sleep, and for this purpose sulphonal or some other hypnotic is occasionally needed.

In connection with this class two internal remedies, which have been especially recommended by Bulkley, are here worthy of mention. They are *cannabis indica* and *gelsemium.* The former is known to be a cutaneous anæsthetic as well as analgesic, and, by virtue of the former quality, should be useful in pruritus. Whether its usefulness in this disease is chiefly owing to this or to another quality, which will be referred to later in connection with the sensory stimulants of the next following class, is uncertain. Gelsemium has proved of benefit in some cases (more especially, according to the writer's experience, in protracted cases of urticaria), but the doses required are so large as to forbid their long continuance. It will be referred to again under motor depressants (*F*). Finally, the antipyretics phenacetine and antipyrine have some effect upon pruritus, though less than upon the sensation of pain.

The local sedatives used in this disease are generally far more satisfactory in their effects than the remedies just considered, especially where the disease is limited in extent. They are for the most part agents that tend to retard vital action. The fact that many of them are antiseptics probably implies something more than mere accidental coincidence. Under both aspects their effect is to depress if not impair vitality. Incidentally they are nerve depressants. Acting upon the superficial nerve endings, they tend to retard the so-called nerve vibrations or molecular movements. How they exert this action through the intact epidermis is somewhat difficult to understand, but of the effect produced there can be no question. Typical among the remedies of this class is the group which includes carbolic acid, salicylic acid, salol, and thymol—all antiseptics, and all having undoubted virtues as antipruritics.

Carbolic acid, the most important member of this group, is perhaps, all considered, the most reliable and most generally useful antipruritic which we possess. It was well named by Unna "the opium of the skin." In pure solutions or in combination with other remedies, and even when comparatively weak, its quieting effect on pruritus rarely fails. The two-to-five-per-cent solutions which are most commonly employed, though often of benefit, do not, however, bring out the full antipruritic effect of which this drug is capable. Watery solutions require to be used of less strength than those in oils or fats. They are more apt than the latter to be corrosive, and also, being more quickly absorbed, are more liable to be followed by general toxic effects. For these reasons carbolic acid is preferably employed in oils or ointments, for, though absorption is slow, the effect passes off less quickly, and the stronger solutions are comparatively safe. With proper precautions as to its use, an oily solution of from 12·5 to 25 per cent may be used with perfect impunity, provided the area to which it is applied is of moderate extent.

The following "antipruritic oil" has been largely employed by me for years, both in the local and in the so-called universal forms of the disease, with no more untoward results than now and then a trifling dermatitis, when through oversight the patient has been allowed to make the applications too frequently or has continued them too long. The formula is the following:

℞ Acid. carbol	ʒ j-ij
Liq. potassæ	ʒ j
Ol. lini	℥ j

M. Sig.: Shake before using.

An alkali and an effective keratoplastic agent (the linseed oil) serve both as adjuvant and corrigent to the action of the carbolic acid. To correct the disagreeable odor of the linseed oil, a drop or two of the oil of bergamot may be added.

Salicylic acid and *salol*, though less energetic in their effects, act similarly to the carbolic acid. They may be used in combination with other drugs or by themselves in oil or ointment, or sometimes in alcohol, and also in superfatted soaps.

Thymol, which is a cutaneous anæsthetic as well as antiseptic, is also in certain cases of universal pruritus an admirable antipruritic, but, on account of its irritating effect, can not be used where the skin is very sensitive. It is well combined with menthol in a three-per-cent (of each) alcoholic solution. Doubtless other remedies of like character might with advantage be added to this group.

The *corrosive chloride of mercury* is a well-known antiseptic which has also a reputation as an antipruritic. It is difficult to explain the latter action except by regarding this agent as a local sedative by virtue of its hostility to all forms of life and its ability to retard excessive vital action. The marked anæsthesia of the skin that is produced by concentrated solutions is doubtless due to this property.

Certain other local sedatives of the skin, though not in the antiseptic group, yet apparently owe their effect to a similar retardation or arrest of molecular movement in the affected sensory nerves. Such is *cocaine.* The decided anæsthetic action of this drug upon mucous membranes, upon abraded surfaces, or when used subcutaneously, would seem to indicate it as a specific in pruritus. For two reasons it has proved disappointing: First, because of the difficulty of making its action felt through the intact epidermis, and, second, for the reason that any tissue when long or frequently subjected to its action suffers a certain atony and enervation that seem to render it more predisposed after than before to the irritation or irritability the drug was intended to alleviate. This latter is a common effect of prolonged use in the eye or nose, and I think I have verified similar consequences after prolonged use in pruritus progenitalis. These objections by no means preclude its use entirely. It is often resorted to with most satisfactory results in localized forms about the mucous orifices, upon raw or abraded surfaces, and sometimes with appreciable effect even where the epidermis is apparently intact.

Other sedatives of this class are *cyanide of potassium* (ʒ j; water, Oj), *chloroform* (ʒ j; glycerin, ℥ ss.; water, ℥ viij), and *camphor* in combination either with an inert powder or with chloral, the mixture being properly diluted. It is probable, however, that the three last-named remedies act not only, often not chiefly, as sedatives, but partly as substitutive irritants—a class to be considered later on. Of a somewhat similar complex nature is the antipruritic effect of *hot water*, which calms the nervous excitement, not only by direct sedation of the sensory nerves, but also by its general relaxing effect, removing pressure or constriction of the nerves; and furthermore, at the beginning at least, it is a powerful substitutive irritant. To be effective, the temperature should be over 100° F., or as hot as can be tolerated, and the applications should be prolonged for several minutes.

It is evident that the impaired conductibility of the sensory nerves with hypopselaphesia—which, as I have endeavored to show, is in greater or less degree an essential condition of the pruritic sensation—though it is not necessarily antipathic to the hyperæsthesia, nevertheless affords special and independent indications for treatment. While the condition of hyperæsthesia calls for depression, or at least repression, that of hypopselaphesia demands a certain kind of stimulation. Hence we distinguish in the therapeutics of pruritus a third class of remedies:

C. **Sensory Stimulants.**—The kind of stimulation it is intended by these to effect is not of that general character which simply augments the common irritability of the skin, but it tends rather to enhance its higher and perceptive sensibilities. By its action the function of the sensory nerves is so improved that sensations of contact or temperature, which through obstruction are aggravated into the fret of itching, find freer channels of escape and a more normal interpretation in the sensorium. It is more especially in such forms of pruritus as are associated with hypopselaphesia as a predisposing cause—as, for example, in pruritus senilis—that remedies of this class are indicated. An example of this kind of stimulation has already been alluded to in speaking of the mechanical modes of relief that may be substituted for scratching. It probably constitutes an incidental effect in the action of various antipruritic remedies more properly belonging to other classes. There is one, however, that would seem to legitimately belong here—namely, *electricity*, whether in the form of galvanism or faradism. Under one form or the other this agent has sometimes proved to be of decided benefit. Perhaps the most effective agents of this class are those that act upon the nervous centers. Thus *strychnine*, in those cases of pruritus which may be called atonic, is a remedy of value. *Cannabis indica*, which is a decided stimulant to the nervous centers and the higher sensibilities, may owe its efficacy in this disease quite as much to this fact as to any anæsthetic effect upon the commoner sensation of the skin. Its action in pruritus, therefore, would be analogous to that which has given it its reputation as a remedy for sexual impotence.

We have seen that a frequent cause of cutaneous pruritus is reflex irritation. Herein is discovered another factor in this indicatio morbi. Reflect the irritation back to its original source, or, taking the initiative as aggressor, invade some inoffensive region that may be made to sympathize with the skin and make it bear a part of the skin's burden; it suggests our fourth class of remedies:

D. **Substitutive Irritants.**—The rationale of the good effect often witnessed in cutaneous irritations from cathartics, hepatic stimulants, and diuretics is that it creates a remote disturbance, into which is diverted a portion of the cutaneous excitement. It is a method of treatment that can seldom be spared, and the aid thence derived may make all the difference between success and failure of local and more direct measures. But in pruritus the sympathetic substitution is not always effected between the skin and a remote or interior part, but between different portions of the tegumentary surface, and, what is more, between different functions and between different kinds of sensation in the skin. Pain is antipathic to pruritus, and one may be substituted for the other. The effect of smarting or stinging applications in relieving pruritus is thus explained. It doubtless explains part of the effect of thymol, chloroform, hot water, and other burning or pungent applications. It is analogous to the action of the "sensory stimulants" described above, where tactile impressions—which, on account of the impaired or occluded media, tend to degenerate toward common sensation—are deflected into the channels of higher special sense. A similar interchange occurs, as we have already seen, between the contact sense and the sense of temperature. Both cold and heat beyond a certain point annul the sensation of itching. Slight changes in temperature often evoke it; but so long as the sense of temperature remains at all noticeably affected it dominates the itching, which, for the time being at least, remains in abeyance. We sometimes avail ourselves of this substitutive action by using cold applications, but the stimulation which these cause is apt to aggravate the pruritic excitement afterward. But a remedy which is one of the best palliatives of itching that we have, and which is especially noteworthy in this place, is menthol, together with the peppermint preparations generally.

Menthol is commonly referred to as an anæsthetic, but it relieves itching as it relieves pain, not by direct inhibitory action on the molecular movements of the sensory nerves, as do the true anæsthetics, but chiefly, as I believe, if not solely, through substituting an exaggerated temperature sense for the perturbed sense of contact, or for the sensation of pain. Goldscheider (Archiv f. Phys. u. Anat., 1886, p. 555), who has carefully investigated this subject, attributes the sense of coolness that follows the application to the skin of menthol or other peppermint preparations to a specific action on the special nerves of temperature, causing what is virtually a hyperæsthesia of the temperature sense. He also found, incidentally, that when a portion of the skin—as, for example, the forehead—had been rendered insensible to cold by applications of ice, and then afterward mentholized, the sensations of burning, pins and needles, and the like, which had been produced by the cold, remained unaffected, in spite of the menthol; from which it is inferred that the latter is not a true anæsthetic. Of its antipruritic virtues there can be no question. It is usually employed in alcoholic solutions (gr. v–x to ℥ j), and may be used in ointment. It is also combined with advantage with salol or thymol.

A fifth class of remedies often indicated in pruritus essentialis may be designated as follows:

E. **Alteratives of Cutaneous Nutrition.**—They include not only absorbent and anticatarrhal remedies to remove the products and curtail the processes of incidental inflammations, which may act as contributory causes of the itching, but such agents as tend to control blood supply and overcome hyperæmia. In this way act diaphoretics, and possibly diuretics, as well as by their substitutive and eliminative or depurative actions. Thus it is probable that *jaborandi*, which is extolled by so many writers for its efficacy in this disease, acts in all three ways: it determines excitement to the secretory instead of the sensory organs of the skin; it promotes the elimination of noxious matters which are irritants to the nerves; and, finally, the diaphoresis depletes the blood-vessels. This drug is especially useful when the skin is hot and dry, and where it has become the depot of noxious materials deposited from the blood—as, for example, in the itching of icterus.

The local remedies belonging to this class include certain resinous or tarry substances, which are especially indicated in associated catarrhal conditions, and have a certain controlling effect upon hyperæmia. Such are *ichthyol* (5 to 10 per cent), tumenol (25 per cent, or pure), occasionally tar, resorcin (3 per cent), and benzoic acid, or benzoin.

When considering the etiology of pruritus, one of the incidental causes of the deranged function of the sensory nerves was ascribed to a condition of impaired nutrition in the skin with defective metabolism. In conditions such as this it is a commonly accepted opinion that agents which promote oxidation are especially indicated. Now it is a significant fact that a large proportion of the remedies that allay itching are oxidizing agents, while, on the other hand, a reducing agent rarely if ever has any direct antipruritic effect. It is the keratolytic substances, which are also as a rule oxidizing agents, from which we largely select our antipruritic remedies. Such are the whole group of antiseptics, the mineral and vegetable acids, and also the alkalies. The oxidizing effect may in many instances be subordinate to other actions they possess, but a property common to them all can hardly fail to have some therapeutic significance.

Led by these considerations, it seemed to me that the solution of *hydrogen peroxide* should be an appropriate remedy for pruritus, and since I first began its use some few years ago I have had abundant verification of the fact that it has antipruritic virtues, more especially in cases of pruritus universalis. It may be used as a toilet wash two or three times a day. In place of this, and perhaps with equal benefit, I have also used an aqueous solution of ozone known commercially by the hybrid name "aquozone."

The final indication for treatment which the etiology suggests relates to the hyperkinesis of the arrectores pilorum muscles. Inasmuch as the spasm affecting these muscles is always secondary to some other condition, measures which relieve the latter will generally be the ones best calculated to dispose of the former, and ordinarily no more special treatment of this contributory factor is needed. But to be complete, our classification of remedies should embrace one more class:

F. **Motor Depressants.**—Among the internal remedies already mentioned, *gelsemium* and *jaborandi* belong certainly to this class, and it is very possible that to this fact they owe in some measure their antipruritic effects. Another remedy which, though recommended more especially in urticaria (see p. 757), should be mentioned here, is *atropia.*

Of the local remedies belonging to this class, the first place unquestionably belongs to the hot-water applications. There might also perhaps be included certain local sedative remedies such as hydrocyanic acid, the cyanide of potassium, conium juice, tincture of arnica, and chloroform—all of which are decided depressants of motor action.

Having thus in a general way met the various indications for treatment in pruritus essentialis, it remains to briefly apply the therapeutic principles laid down to certain special forms of the disease. It must be confessed that however clear these principles may appear in the abstract, to apply them in the concrete—i. e., to individual cases—is not always easy. Often and in large degree we must rely on empiricism in its better sense.

To know the rationale of things is most desirable, but in practice experience is often truer than theory.

Thus, in *pruritus senilis*, while theory suggests more especially the sensory stimulants described under *C*, so complex often are the morbid conditions involved in this form of the disease that recourse must be had to remedies of very diverse nature. In some respects theory and experience here correspond. The successful employment of faradism in senile pruritus that has received abundant testimony is scarcely susceptible of any better explanation than that afforded by the theory of its restoring or stimulating an impaired sensory function. It by no means always succeeds, but in uncomplicated cases it rarely fails of good effect if persisted in. It has seemed to me, however, that it was often effective when applied only to the spine and not directly to the itching surfaces. It is best administered by means of a brush electrode. The cold douche is another remedy in the same line that is sometimes of benefit, and is best used in the morning. In one or two cases patients have assured me that prolonged relief was obtained by certain frictions of the skin at night, using, for example, the rough mitten sometimes employed in bathing. Such a remedy, however, could rarely be recommended as a safe one. For internal use the strychnine and cannabis indica, which are stimulants to the nerve centers, are appropriate remedies and have already been referred to. The tincture of cannabis indica may be given in doses gradually increased from ten drops to a scruple or half a drachm three times a day, unless it should disturb the digestion.

The indicatio causalis in this affection opens a wide field for therapeutic measures, those included in the class of "alteratives of cutaneous nutrition" (*E*) being particularly important. Internally antilithic remedies, alkalies, diuretics, and cholagogue cathartics are required to meet special indications. Locally we may employ the alkaline bath, the hydrogen peroxide, and the oxidizing substances of the antiseptic group. Nor can the sedative applications of class *B* be dispensed with. Which one will answer best can often be determined only by trial. A ten-per-cent solution of salol in benzoinol is of some use; the carbolic oil mentioned above is more powerfully antipruritic, but requires caution. It is best suited to limited areas of itching. Menthol also acts admirably in many cases, either alone or, what is better, in combination with some emollient substance. If too strong or too frequently applied, it is liable, like carbolic acid, to irritate and thus render the skin more sensitive. A remedy highly extolled by the English is liquor carbonis detergens (a three-percent solution in water).

In *pruritus hiemalis* an all-important measure of treatment is protection against cold. The sole cause of winter pruritus, aside from a special predisposing hyperæsthesia, is lowered and more especially suddenly lowered temperature. The first cold day evokes it, and, after raging through a succession of cool days, the first warm day will make it disappear till again the weather changes. The temperature effect may be forestalled to a certain extent by protecting clothing. A minor point, though by no means an unimportant one, is that in making changes of clothing the undergarment should remain as light as that worn during the warmer weather. If wool is required, it should be worn outside this thin undergarment. Sometimes it is well to bandage the legs (where the trouble is always worst), at least for the latter part of the day. At night a wet pack for this portion of the body often gives much relief. A five-per-cent salol superfatted soap (Eichhoff's) may be moistened and smeared over the itching surfaces, where it is allowed to dry on. The surest relief when the itching areas are of limited extent (and such often is the case) is afforded by the antipruritic oil mentioned above. Each morning care should be taken to dress any excoriated or inflamed spots, the result of scratching, with some healing, emollient application, such as the Lassar paste; otherwise there is much danger of developing eczema. Indeed, I believe it very possible that a large proportion of the chronic eczemas of the legs owe their first inception to this very cause—namely, the scratching occasioned by pruritus hiemalis.

In *pruritus of the genito-anal region*, while all possible is being done to remove or abate any accidental cause which may be discovered, the choice of direct antipruritic remedies will depend much on the nature and complications of the case. Special treatment is required for cases associated with eczema or other inflammatory disease. For the itching, perhaps no remedy is more generally useful than hot water. The patient squats over a vessel in which there is water as hot as the hand can bear; after a few moments' use a still higher temperature can be tolerated; with a handkerchief held as a swab between the fingers the water is sopped on for a period of three or four minutes; the part is then gently dried with a soft cloth and well powdered with talc or other inert substance. In all of the forms of pruritus in this region carbolic acid is of very great value, but, as already intimated, to be of much avail it must be used strong. The above-mentioned "oil" is especially useful in these regional forms, but should not be used too frequently or where much inflammation prevails. Menthol is also exceedingly useful, and salol may be added with advantage. All of these should be followed by copious applications of a soothing powder. In some cases, more especially where the parts are sore or abraded from long scratching or rubbing, the greatest relief will be afforded by cocaine, whether in a four-per-cent watery solution, or, what is better, in some soothing emulsion or thin ointment.

For *pruritus vulvæ* some of the special remedies advised are painting the parts every night with compound tincture of benzoin, or, in some cases where the surface is thickened from long irritation, occasionally touching the affected part with a rather strong solution of nitrate of silver (℈j - ʒj in water ℥j). Many authorities have advised applications of corrosive sublimate (gr. ¼-j, water ℥j); or the following prescription of Bartholow will sometimes be found useful: ℞ Corrosive chloride of mercury, 1 part; alum, 20 parts; starch, 100 parts; and water, 2,500 parts. M. Whenever the itching affects the mucous membrane it can generally be relieved by cocaine.

For *pruritus scroti* Crocker advises painting the part with a solution of silver nitrate (gr. x–℥j) in sweet spirits of nitre. In inveterate cases I have sometimes employed with considerable success a method of treatment first suggested by Vidal. It consists in scarifying the entire itching and usually thickened surface either with Squire's scarifier or an ordinary scalpel. The incisions need not go much beyond the epidermis, but there is an advantage in drawing a little blood. Afterward the part is dressed with a thin layer of Lassar paste which may contain a little cocaine. The layer should be thin, for it is a fact of common experience that ointments are rarely well borne in pruritic affections of the genito-anal region.

The remedies most useful in *pruritus ani* are the same generally as those for the vulvar and scrotal forms. Sometimes relief can be obtained here only through substitutive irritants. A liniment containing chloroform or camphor in sufficient strength to cause considerable smarting will occasionally give relief to the intense itching which can be secured in no other way. A method suggested by Allingham for aggravated cases would perhaps belong more properly to the class of sensory stimulants. A bone plug an inch and a half long and about as big in diameter as the end of the forefinger is slipped into the anus on retiring, and retained in position by means of a compress through the night.

SENSOMOTOR NEUROSES. (Edward Bennet Bronson.)

URTICARIA.

Definition.—Urticaria, or, as it is sometimes called, "nettle rash," or "hives," is a pruritic, angio-neuropathic disease of the skin, characterized by an eruption of peculiar efflorescences known as wheals or pomphi.

Symptomatology.—The wheals of urticaria correspond in their general characters to the effects produced in the skin by the sting of the nettle (*urtica*, whence the name of the disease), or by the bite of the mosquito and other insects. They are firm, elastic, smooth, rounded, or more or less elongated elevations of moderate height, and flattened on top, varying greatly in size, and invariably accompanied with itching which often has a stinging or tingling character. The efflorescence usually begins as an area of circumscribed redness, which soon rises above the *niveau*, while at the same time the central portions or entire surface become blanched as if bloodless, and the itching is intense. Later the redness usually reappears, followed by a rather sudden subsidence of the elevation, cessation of the itching, and a return of the normal color, and at the end of the process, which may last only a few minutes or for several hours, or even days, there is usually not a trace of the lesion left to mark its former site. Pathologically this process chiefly consists in a localized hyperæmia succeeded by ischæmia of the affected area, together with a sharply circumscribed œdema in the derma and also in the intercellular meshes of the rete mucosum.

Pathology.—Though urticaria has been commonly classed with inflammations, there is little more reason for this than for regarding a simple rubor or a mechanical œdema as inflammatory. The sudden appearance and disappearance of the affection imply a neurotic character, which is further indicated by the pathological anatomy. The pathogenesis of the process has received various explanations. Of these, the one which seems most rational is given by Unna (Beiträge zur Anatomie und Pathogenese der Urticaria simplex und pigmentosa. Dermatologische Studien, Drittes Heft, Hamburg und Leipzig, 1887). According to this authority, the entire mechanism in the production of the wheal is explained as the effect of spasmodic contraction of the muscular coat of the veins situated in the deeper portions of the derma, which, by reducing the caliber of these vessels, prevents their receiving the lymph from the adjacent tissue, where, in consequence, it collects in distended lymph spaces, forming little lacunæ, first in the deeper parts of the skin, then higher up, and finally overflowing into the rete. In regions where, instead of a thick layer of adipose tissue, the hypoderm consists only of a loose meshwork, of connective tissue (as, for example, in the eyelids), the fluid spreads through this, forming a more diffuse œdematous infiltration than usually accompanies the wheal in other situations. The ischæmia in the papillary body, while it may be partly due to extension of the angiospasm to the arterioles, is attributed rather to compression resulting from the distended tissue beneath. It is probable, as Unna also admits, that the spasm affects in some degree the muscular coat of the arterial vessels, though to a less degree than that of the veins. Indeed, in such a condition it is natural to suppose that the entire system of organic muscles within the area of the wheal would be more or less affected by the spasm. If the process be carefully observed from the beginning, as may be done in certain cases of urticaria, by provoking the eruption through smartly rubbing the skin, it will be seen that the first thing to appear after the erythematous redness excited by the irritation has continued for a little while is the elevation of fine papules occupying the sites of hair follicles, not unlike the appearance of cutis anserina, and, as it would seem, produced in the same way—by spasm of the arrectores pilorum muscles. Assuming that spastic contraction of these muscles is one of the possible causes of itching, as set forth in the etiology of pruritus essentialis (see pp. 734, 735), we discover in the urticarial hyperkinesis not only an explanation of the physical changes in the wheal, but also in a measure of the attendant sensory disturbance. It is probable, however, that in the manifestations of urticaria there are represented a motory and sensory neurosis combined, the pruritus being due to influences that act directly upon the sensory nerves and not necessarily through the muscular spasm.

Etiology.—The occurrence of urticaria always implies a peculiar predisposition, inasmuch as the causes which suffice to provoke its manifestations in one individual may not in another. Such a disposition is necessary even to cause the wheal that usually follows the bite of a mosquito or sting of nettles, for in certain individuals this usual effect does not follow. The predisposition which doubtless is essentially a form of hyperæsthesia may be more or less pronounced, and also varies greatly with regard to the character of the stimuli or irritants to which it responds. The source of these latter may be either external or internal.

The external provoking causes of urticaria would comprise almost every form of irritation to which the skin can be subjected. Indeed, there is scarcely any influence from without that may be brought to bear upon the skin that is not potentially an exciting cause of urticaria, given the necessary predisposition. The name of the disease is not applied, however, to such effects as are limited to the exact site of the irritation, but only to effects which are more or less general and apparently spontaneous, though often due to external influences. Thus any number of mosquito bites does not constitute an urticaria; but when, through continuance of the irritations, or through excessive irritability of the skin, wheals other than those produced directly by the bites begin to appear, it becomes a case of urticaria. Such excessive irritability may be developed in connection with many cutaneous diseases, such as eczema, prurigo, and pemphigus, and under these circumstances the two diseased conditions should be recognized.

Simple mechanical influences may excite the disease or its manifestation where the predisposition is well marked. Friction of the skin may cause it, as from the nails, or from coarse or constricting garments. The raised marks or figures sometimes observed in hysterical women (*femmes autographiques*), or that are sometimes produced as a trick by spiritualists, are urticarial in character, and when similar effects occur in well-marked cases of the disease it is described as **urticaria factitia.**

Temperature influences may evoke the eruption. In some cases exposure to cold, in others the action of heat, will cause the wheals to appear. In a woman with very marked predisposition to the disease the wheals appeared whenever the temperature was suddenly lowered. Season had but little influence, but whenever there was a change to cooler weather, whether in summer or winter, and especially on damp, cool days, the eruption was sure to come out. When a cold wet sponge was applied to the chest, after four or five minutes the entire surface that had been wet became one great wheal. First there appeared an erythema, and afterward the characteristic blanching. Where drops of water had trickled down between the breasts their courses were graphically and exactly represented by urticarial elevations. In this case the preliminary "goose-flesh" appearances, with attendant itching, was well marked. In many cases the warmth of the bed will suffice to excite the eruption.

The internal causes of the disease are either exciting or predisposing. They may either greatly augment the disposition to urticaria, so that wheals develop upon exceedingly slight provocations, or they may evoke the eruption directly through irritations transmitted from the interior to the cutaneous surface. The disposition may be exaggerated through a neurotic temperament, through certain diathetic conditions (such as the arthritic, diabetic, or malarial), or through idiosyncrasy. The last-named condition usually shows itself in a peculiar susceptibility to the action of certain foods or drugs. That form of urticaria which is produced only by changes of temperature, more especially cold, must also be ascribed to idiosyncrasy.

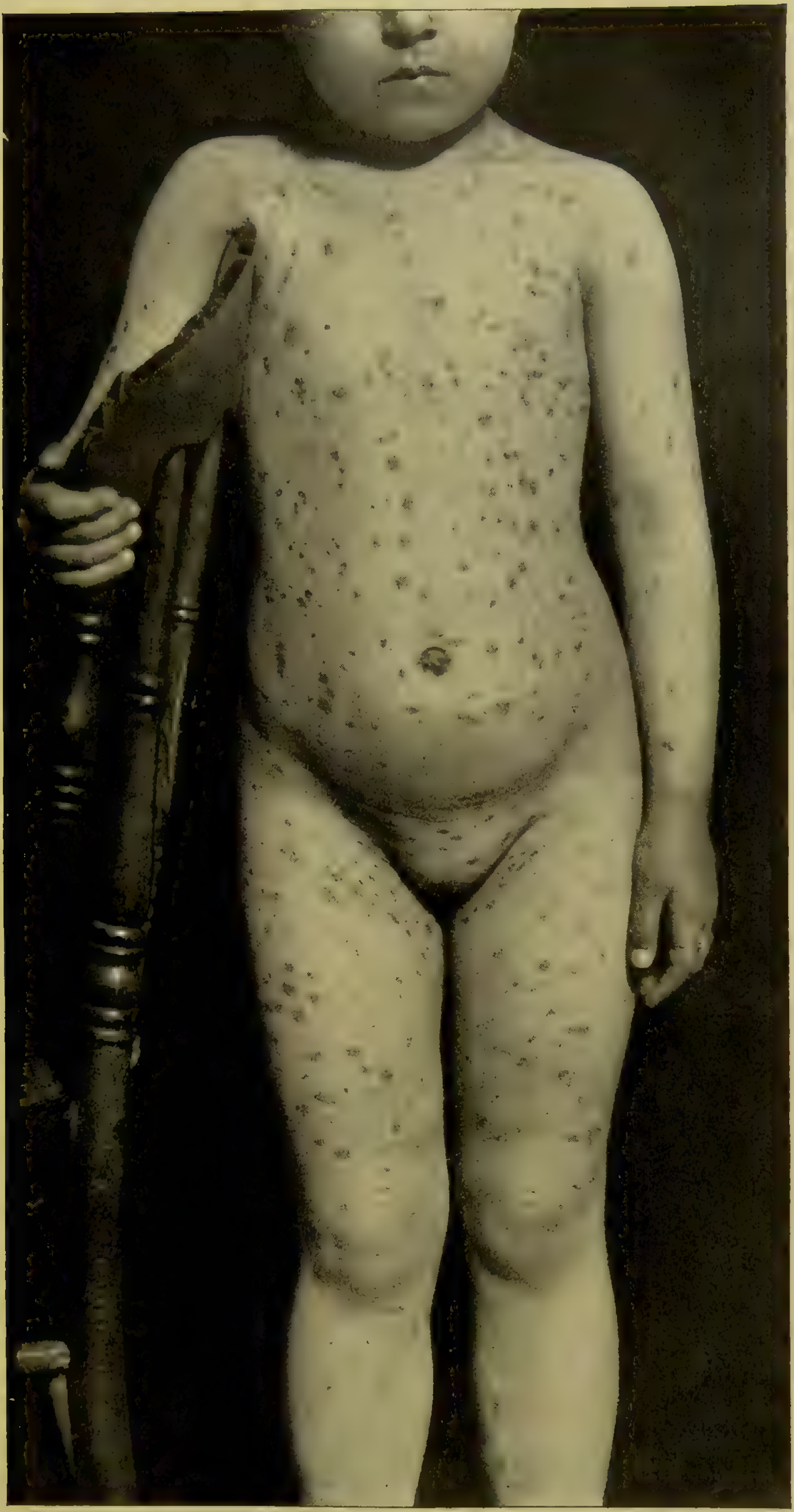
The exciting causes that are transmitted from the interior are of great variety. Emotional excitement in persons who are predisposed to this form of irritation of the skin may suffice to bring on an attack. Hysterical crises, or other neuropathic conditions, may directly produce it. The same is true of certain derangements of the organs of generation, especially in the female. It is sometimes associated with certain physiological states—as, for example, menstruation and pregnancy. The most frequent causes, however, relate to the digestive apparatus. Any embarrassment of digestion is liable to produce it, both where the predisposition is pronounced and where it is not. The effect is sometimes produced almost immediately after the ingestion of some disagreeing substance. Particular articles of food are apt in certain individuals to be followed by such an effect. Among the most common offenders of this class are fish, particularly shellfish, such as crabs and lobsters, less commonly clams and oysters; pork, occasionally mutton, cheese, sometimes eggs, mushrooms, cucumbers, strawberries, and many other fruits. Where these articles invariably offend, as they do in some cases, it is evidently the result of idiosyncrasy. A similar result sometimes attends the action of particular medicaments. Among those most apt to cause urticaria are quinine, copaiba, valerian, hyoscyamus, salicylic acid, and chloral, though the list might be greatly extended. There is, perhaps, no drug that may not sometimes encounter this form of intolerance. In some cases the effect is produced invariably by these drugs, in others only occasionally.

Clinical Forms.—The clinical forms under which the eruption of urticaria occur present a great variety. Urticaria is sometimes spoken of as acute or chronic; but, so far as the wheals (which constitute the eruption) are concerned, it is always acute. **Urticaria Chronica** is a term that relates rather to the tendency than to the eruption itself. A better term is *urticaria recurrens.* It is the *cnidosis* of Alibert. When the wheals persist for an unusually long period the term **Urticaria Perstans** is used. In most cases the disposition to the attacks is pretty uniformly pronounced over the entire cutaneous surface, the greater or less abundance of the wheals in any particular region depending mostly upon the exposure to external irritation. As a rule, however, they are more often observed on the covered than the uncovered portions of the body. The mucous membranes are not exempt. Sometimes an attack is accompanied by sudden swelling in the throat, that may produce alarming dyspnœa, or the tongue may become greatly swollen. It has been inferred, from the gastric disturbance that often attends an urticarial attack, that something analogous to the cutaneous eruption may occur in the stomach.

The wheals are usually of an oval shape, and on an average vary in size between that of a small pea and that of a Lima bean; but they are subject to great variations in this respect. In the form known as **Urticaria Gigans** they may reach the size of a hen's egg, or something even larger. They are then usually fewer in number, and persist longer than the ordinary forms. It is doubtful whether it is proper to include here, as has been done, the *acute circumscribed œdema of Quincke.* Besides being much more deeply seated, there is nothing of the sensory disturbance in the latter which is characteristic of urticaria; there is not the redness or the blanching of the surface, and it is rarely if ever associated with the ordinary forms of urticaria.

Urticaria Papulosa.—In children, an urticarial condition attended with the formation of small inflammatory papules about the follicles is known as urticaria papulosa, or *lichen urticatus.* It is probably due to similar causes to those which produce urticaria in the adult, and mingled with it may be seen many efflorescences that have the characteristic features of wheals. The follicular inflammation is doubtless the result of especial sensitiveness and vulnerability of the skin. It most commonly occurs in infants. The variety known as *urticaria factitia* has been referred to above. Where the irritability of the skin is very pronounced, long white

PLATE XXIII.



Urticaria Pigmentosa.

(From the collection of photographs of Dr. George Henry Fox.)

ridges may appear that look like welts from the stroke of a rod or whip.

Sometimes urticaria is associated with hæmorrhagic tendency or with purpura, when the wheals may become ecchymotic, **urticaria hæmorrhagica** (*purpura urticans*). When there is an unusual effusion of serum it may escape into the epidermis so as to form a bleb. It is known as **urticaria bullosa.**

URTICARIA PIGMENTOSA.

Urticaria pigmentosa is a form that is peculiar to the period of childhood, and differs from the ordinary forms chiefly in the repeated recurrence of wheals at the same points where more or less stationary efflorescences are formed that are attended with pigmentation. Ordinarily chronic urticaria implies merely a prolonged tendency to urticarial attacks; but here another element of chronicity is introduced, in that particular areas of the skin remain for long periods subject to wheals, many of which always recur at the same sites. The result is that more or less permanent lesions are formed, producing a hyperplasia that is augmented by each succeeding attack. The disease begins within the first few months of life, and may at first present the ordinary features of urticaria. The attacks continue to recur and gradually the wheals become yellowish in color, and the elevations caused by them do not entirely subside, but form permanent papules. These increase in size, and sometimes form patches of considerable area through coalescence of adjoining papules. New lesions are continually being formed, and the older ones deepen in color, becoming brownish, and may resemble xanthoma patches, but have a firmer consistence. When the papules or nodules are rubbed they become irritable, swollen, and assume the appearance of wheals again. Bullæ may accompany them, and sometimes ecthyma. The lesions when fully formed have a deep fawn-color, while interspersed among them will be others of more recent development and with a more reddish tint. The process usually continues active for several years, after which the nodules or papules gradually subside and the pigmentation disappears. Occasionally the disappearance of pigment begins first at the central portion of the lesion, leaving a ring of pigmentation outside.

The *pathology* of urticaria pigmentosa has been a matter of some dispute. The papular or tubercular elevations left by the wheals of this disease are chiefly owing to an accumulation of cells in the upper portions of the cutis and along the blood-vessels. Many writers have described hæmorrhages in the skin surrounded by cell infiltrations. The pigmentation has by some been attributed to these hæmorrhages. It is maintained by Unna (*loc. cit.*), however, that the pigment is not of a hæmatogenous nature and situated in the cutis, for were this the case the discoloration would be blackish or bluish black, while in this disease it is always of the brownish color characteristic of pigmentation in the rete. In fact, it is in the rete that the most decided pigmentation occurs. Unna regards the cell accumulations in the cutis as made up of "mast" cells, a fresh deposit of which takes place with each renewal of the urticarial process. He attaches little importance to the hæmorrhagic spots described by other writers, and inclines to the belief that they occur only in specimens that have been recently excised, and that they are produced artificially.

Treatment.—In adopting measures for the relief of urticaria the distinction must first be made between cases that are due to an inherent and more or less permanent predisposition to the disorder and those that occur only as the expression of some temporary derangement. The former class of cases—cases of urticaria chronica seu recurrens, as commonly called—are by far the most difficult to manage. Where the disposition is due to an idiosyncrasy that reacts only to particular irritants which it is possible to avoid, the indication is obvious and the case is a comparatively simple one. But the provoking cause is not always such as can easily be avoided, as, for example, when it is referable to change of temperature.

Moreover, in many cases of recurrent urticaria the exciting causes are extremely varied and often not easy to determine. To directly combat the predisposition is impracticable. Much may often be done by indirect assault when the origin of the trouble can be traced to some diathesis, through measures tending to ameliorate the latter. Furthermore, inasmuch as the morbid predisposition to urticaria presupposes a locus minoris resistentiæ, any derangement of the economy or departure from general health would naturally aggravate this weakness; and, conversely, whatever tends to improve the general health would tend to diminish the morbid disposition.

As a rule, however, whether the urticaria is due to a particular predisposition or habit of body or to some temporary disorder, there is little opportunity afforded for treatment until after the onset of the attack. Then a knowledge of any diathesis or idiosyncrasy or interior derangement may be turned to good account. For example, it might particularly suggest antilithic remedies, nervines, or evacuants, according to the nature of the case. The success that has sometimes followed the more or less empiric use of salicylic acid or salicylate of soda has been generally, I believe, owing to the fact that the attack was an effect of the arthritic diathesis. For many cases the only internal treatment of much avail is addressed to the nervous system, and these cases are more particularly the neurotic ones. Crocker (Diseases of the Skin, 2d ed., Philadelphia, 1893, p. 131) states that long-continued doses of arsenic in "apparently causeless cases" not "connected with disorder of the alimentary canal" has been most successful in his hands. Naturally during the attack this remedy would be of little use. Often bromide of potassium is of marked value in cases of this class. Likewise in the neurotic form, remedies that act upon the vaso-motor centers are especially indicated, such as belladonna or its alkaloid atropia. Antipyrine and acetanilide have also been recommended.

Where there is reason to suspect that an attack is associated with gastro-intestinal irritation, as in a very large proportion of cases it is, recourse should be had without delay to emetics or cathartics. If the attack has but just begun, it is possible to arrest it at once by means of free emesis. Later on purgation by saline cathartics will often afford prompt relief, whereas if neglected the trouble may not disappear for days or even weeks. If the derangement of digestion is disposed to continue, or is a chronic condition, the appropriate measures of relief must not be neglected.

In very large measure the treatment of an urticarial attack is addressed to the itching. Most of the principles of treatment, together with the remedies indicated, which were fully described under Pruritus Essentialis (see pp. 739–747), are therefore applicable here. The conditions of hyperkinesis, upon which, as we have seen, the production of the wheal chiefly depends, would seem to suggest the use more especially of the motor depressants. A number of our most serviceable remedies belong to this class. It is probable that the good effect of atropine when used in full doses—such as are always required to produce this effect (from $\frac{1}{150}$ grain upward)—is due not to the primary but to the secondary action of the drug. The primary action attendant upon the smaller doses tends to excite muscular contractions and cause increased vascular tension. In its secondary action the effect is just the contrary of this; the muscles relax, the vessels are dilated. It is doubtless through release of tension in the cutaneous muscles that this drug acts so favorably often in the urticarial hyperkinesis. Gelsemium, another motor depressant, has also been found useful in this disease. Locally, through a similar action, hot water or the Turkish bath is sometimes employed successfully. Another local remedy of this class is chloroform. Gull (Guy's Hospital Reports, 1859) has mentioned a case of factitious urticaria in which the slightest friction would provoke the eruption, but after chloroform had been dropped upon the skin no wheals could be produced within the area to which it had been applied. This remedy is best employed in ointment (ʒ ss.–℥ j).

Substitutive irritants are also of the greatest value. The common remedy of vinegar and water, lemon juice, diluted acetic and citric acids, alcohol, the tincture of various essential oils, are all of this class. Menthol in alcohol or in pencil, if brushed over the wheals, often gives great relief, and the same is true of the carbolic and other sedative applications of the antiseptic group. A prompt resort to one of these the moment a wheal appears by arresting the irritation at once will sometimes forestall a more extensive outbreak. Kaposi recommends for this purpose the following: ℞ Spts. lavandulæ, ℥ jss.; spts. vini gallici, ℥ ijss.; ether. sulph., ℈j; aconitinæ, gr. viij. M. It is to be dabbed on the first wheals that appear, and the wet surface is then powdered. In chronic or recurrent urticaria the attacks occur usually only at certain periods of the day, as, for example, an hour or two after meals or on going to bed. By particular caution at such times to avoid heat or excitement, and, if necessary, by resorting to the remedies above mentioned, if the attack can not be prevented, at least its severity may be mitigated.

For *urticaria pigmentosa* no special plan of treatment has yet been advanced. It must be managed on the general principles already given, according to symptomatic indications, or according to any causal indication that may be discovered.

ANGIONEUROTIC ŒDEMA. (George T. Elliot.)

Synonyms: Œdema Circumscriptum; Quincke's Œdema; Acute Circumscribed, Idiopathic, Noninflammatory Œdema; Urticaria Tuberosa; Giant Urticaria.

Definition.—A neurosis, characterized by the acute appearance of circumscribed cutaneous swellings, especially of the face and extremities, which tend, after a variable period of existence, to disappear rapidly without leaving any secondary changes in the skin. It also may affect the mucous membranes of the mouth, the pharynx, and of the larynx, and is believed to develop likewise in the stomach and intestinal canal. Since the careful description of angioneurotic œdema by Quincke in 1882, many cases have been reported by Strübing, Dindelacker, Osler, Starr, Riehl, Unna, and others, and it has been more or less exhaustively studied.

Symptomatology.—The disease usually makes its appearance without premonition, though it may be preceded by general *malaise*, a feeling of depression, and gastro-intestinal uneasiness. The œdema originates rapidly, reaches its height of development in a few minutes, or in a number of hours, and then remains stationary. The swelling is circumscribed and well defined, and of variable size. The nose may be as large as a small fist, the lips protrude in the form of two sausages, or, as in one of my cases, the entire outer half of the thigh was occupied by the lesion. On the other hand, the swellings may be of small dimensions. The skin over the lesions is sometimes scarcely changed in color, but it may be of a dark red or a pink, though it is more frequently waxy and in marked contrast to the surrounding normal surface. There is no pitting on pressure, as in œdema from cardiac, renal, or from other causes, though a slight evanescent depression may be made.

The subjective disturbances are a scalding, burning sensation, experienced during the development of the swelling, followed by itching. There is also a feeling of tension and awkwardness in the affected part. Pain or other inflammatory symptoms are not present. The surface temperature is said to be elevated in some cases, in others lowered.

After remaining stationary for a few hours, or even for several days, the swelling begins to disappear rapidly, but it may reappear upon some other portion of the body more or less distant from the primary lesion. There is no limit to the number of the swollen areas. After the swelling has subsided, there is no trace of its former presence, but a slight numbness may remain.

A patient may have only one attack, or they may be numerous, occurring at short or long intervals. Between the attacks, the general health is usually perfectly good. It is stated by Quincke, Strübing, Osler, and others that precisely similar symptoms develop in the mucous membrane of the gastro-intestinal canal, limited perhaps to that locality in a subject of œdema circumscriptum, or followed later on by the appearance of the disease on the skin. Implication of the tongue, the pharynx, and of the larynx have been repeatedly mentioned. The development of the swellings in these places is the same as when they occur on the skin, so far as their general characteristics are concerned, though certain symptoms arise which are due to the region affected. The enlargement of the tongue in one of my cases was enormous; it protruded from the mouth and interfered most markedly with speech and deglutition. If the pharynx is attacked, there is a certain amount of dysphagia and sense of suffocation, depending upon the degree of the swelling. When the larynx is invaded, the sensation of suffocation is intense, dyspnœa is severe, and death has resulted in some cases from œdema of the glottis.

The gastric symptoms, when the stomach was attacked, consisted in a sensation of tension and uneasiness, loss of appetite, and sometimes constipation, preceding the attack. These were followed by distention of the epigastric region, severe colic and vomiting. The contents of the stomach were vomited first, and then an abundant watery, stringy fluid. There was great thirst, and urine was voided in abundance. Occasionally, excess in phosphates was discovered on analysis of the latter. Owing to the severity of the pain, there might be restlessness and insomnia. The attack might last a short time, or for several hours or longer, and occasionally, after subsidence of the pain, a profuse colliquative diarrhœa came on, with retraction of the abdomen and considerable prostration. The patient usually recovered quickly, but for a few days after an attack was weak and prostrated.

Pathology.—The pathology of circumscribed œdema is obscure. All the factors which appear to participate in its production point, however, to the nervous system as the site of the particular disturbance which leads to its development. In one of my cases, urticarial lesions appeared and coexisted with those of circumscribed œdema. I would regard the process as essentially a vaso-motor neurosis, closely allied to urticaria.

Etiology.—Œdema circumscriptum occurs most frequently in adult life and in males. It has been seen, however, in children, and in an infant of three months (Dindelacker), and also in old age. Strübing, Quincke, and others have pointed out the influence of heredity in its production, and Osler reported having found it in five successive generations in one family. The general health of the patients is usually very good, but in my cases, one had chronic constipation, and another committed alcoholic excesses and suffered from gastro-intestinal disturbances. Mental excesses and bodily fatigue, grief, anxiety, fright, and traumatisms, even of slight degree, have been mentioned as etiological factors. Matas reported a case in which it masked a malarial attack, occurring every day at the same hour, lasting a short time and then disappearing. There were no chills or fever, etc., but it appeared to take the place of the malarial attack, in the same manner as urticaria so often does in malarious districts. The process has likewise appeared to be induced by certain foods ingested —as fish, apples (Osler), etc.—and in these particulars also it resembles urticaria. It is stated that its occurrence on one place of the body predisposes to relapses on the same locality.

Diagnosis.—The diagnosis rarely offers any difficulty. It should be differentiated from menstrual œdema, the œdema of arthritic nature, and the persistent œdema of Ries and Lassar. The indurated œdema usually secondary to a phlebitis, an adenitis, etc., should not be confounded with it.

Prognosis.—As far as the general health is concerned, the prognosis is good. Some deaths have occurred, owing to œdema of the glottis, but they are few in number. A cure, however, can not be promised, as a patient may remain free for years and then suffer a relapse. In consequence, the prognosis should be a guarded one.

Treatment.—It is an open question whether treatment is of any value in a curative sense. In my cases, when constipation and other gastro-intestinal irritation were relieved the attacks ceased, but they may have done so spontaneously. Matas cured a case with large doses of arsenic. Starr recommends massage. Hartzell advises saline laxatives and salicylate of soda. In addition, strychnia, atropia, ergot, the bromides, etc., have been used, but with little result. Dry warmth and compression have at times given relief. Owing to its exceedingly beneficial effects on chronic urticaria, I would recommend during an attack pilocarpine muriat. (gr. $\frac{1}{20}$ to $\frac{1}{4}$), hypodermically, having been led to use it by the advice of Dr. Lustgarten, and found its effects most excellent.

CLASS VII.—DISEASES OF THE APPENDAGES OF THE SKIN.

A. DISEASES OF THE SWEAT GLANDS.

(S. Pollitzer.)

The diseases of the sweat glands may conveniently be divided into those in which an anatomical change has been found in the glands or their ducts and those in which no such change has been demonstrated—i. e., into functional and organic.

It is not difficult to account for the circumstance that the sweat glands have been the subject of noticeably little study compared to the immense literature devoted to other fields of dermatology when we consider the obstacles which the location of the chief portion of the gland at the bottom of the cutis create; the fact that the great number and close relation of the glands make it difficult to observe clinically the beginning of a disorder in a single gland; and, finally, the early involvement in most cases of the neighboring cutis, which may entirely obscure the relation of the sweat gland to the pathological process. There is no reason to believe, however, that the sweat glands are favored with an exceptional immunity to the disorders to which all other glandular structures are subject. The abnormalities in the secretion of the glands are more manifest. A sweat gland may be looked upon as the end apparatus of a set of nerve fibers, and any change in the secretory cells, in the nerve supply, or in the plexus of vessels surrounding the sweat coil must produce a changed function in the gland. But even here our knowledge is very far from being complete. To appreciate the difficulties underlying a systematic pathology of the functional disorders of the glands it is only necessary to refer to the widely diverging theories of their physiology. Do the sweat glands secrete the watery sweat only, or do they supply an oily fluid also? Is the nerve supply derived from the sympathetic, or is it of spinal origin? Is there a single sweat center, or are there many in the cord and brain, are there peripheral sweat ganglia, or are there true secretory fibers at all? May not all the facts brought out by Luchsinger, Vulpian, and Adamkiewicz be equally well explained through the agency of the nerves supplying the vessels and muscles of the sweat glomerulus? These questions have been discussed in the first part of this volume.

FUNCTIONAL DISORDERS OF THE SWEAT GLANDS.

The functional disorders of the sweat glands include those in which the perspiration is normal in character but increased or diminished in quantity and those in which there is an abnormality in the composition of the sweat. The disorders, therefore, are those in which there is a quantitative or a qualitative change in the sweat. An increase in the quantity of sweat is called hyperidrosis; a diminution, hyphidrosis; an absence, anidrosis; hyphidrosis is a term rarely used, anidrosis being commonly employed to indicate both diminution and absence of sweat. Qualitative deviations from the normal may be of endless variety, if we include all the changes in the relative proportion of the different substances normally present in the sweat. These changes, however, rarely produce symptoms, and, except in the case of uridrosis, in which there is a great excess in the amount of urea normally present in the sweat, have not received distinctive names. Changes due to abnormal color or odor are called chromidrosis and bromidrosis respectively.

HYPERIDROSIS. (S. POLLITZER.)

Synonyms: Ephidrosis, Sudatoria, Idrosis.

Definition.—A disturbance in the function of the sweat glands in which the secretion of perspiration is excessive.

Hyperidrosis may be general or partial; it may be merely a passing phenomenon or it may be constant; and its limitations as to the quantity of sweat are indefinite.

The secretion of a large amount of sweat is normal in many conditions; all persons sweat after violent exercise, after the ingestion of large amounts of fluids, especially during warm weather, and under the influence of certain emotions. Profuse sweating occurs regularly also in obesity, in phthisis, articular rheumatism, intermittent and other fevers; but these are pathological conditions, and the hyperidrosis is therefore a disease. We must, in short, regard profuse sweating as a disease whenever it develops in the absence of those natural familiar conditions, like exercise, etc., under which it occurs in all healthy persons.

The dermatologist is not concerned with hyperidrosis when it is universal. The treatment of the pathological states underlying it devolves on the general practitioner.

Localized Hyperidrosis—that is, excessive sweating over a comparatively small area of the skin—is probably nearly always dependent on faulty innervation, and may be due to stimulation of the cerebro-spinal nerves or paralysis of the sympathetic (Bouveret, Des Sueurs Morbides, Paris, 1889). A large number of observations have been made which show the intimate relation of the nervous system and the sweat glands, but our knowledge in this field is only fragmentary. Lesions of the brain itself sometimes affect the sweating; thus Bouveret records a case of gumma of the brain with unilateral hyperidrosis; Adamkiewicz (Sitzungsb. d. physiol. Gesells., Berlin, December 12, 1879; see also Die Secretion des Schweisses, Berlin, Hirschwald, 1878) a case of abscess of the brain with hyperidrosis of the opposite arm. The profuse sweating of exophthalmic goître, of delirium tremens, lead poisoning, nephritic anuria, and the comatose state of all the acute infectious diseases suggest the possibility of the brain's containing sweat centers. Adamkiewicz found a small glioma in the medulla in a case in which there was hyperidrosis. Lesions of the cord, especially those in which the reflexes are exaggerated, are often accompanied by hyperidrosis. Lesions of the sympathetic or its ganglia, when associated with cutaneous erythema and local elevation of temperature, are almost invariably accompanied by hyperidrosis; this was shown in the classical experiments of Claude Bernard on the cervical sympathetic—the foundation of the experimental physiology of the sweat glands. Tumors of the neck of any kind acting on the sympathetic may produce local hyperidrosis. In the second, the paretic stage of migraine, the skin is reddened and bathed in perspiration. In lesions of the peripheral nerves, as Weir Mitchell has shown, the anidrosis of the glossy skin is preceded by a stage of hyperidrosis. In hysteria and in disturbances of menstruation, especially at the climacteric, there is often hyperidrosis. Aubert (Ann. de Dermat. et de Syph., 1878) has examined the sweat secretion in various skin diseases; he finds the secretion diminished in quantity in ichthyosis when the affection is deep, increased when it is superficial; absent in purpura, but excessive in the region around each macule; increased in nævus spilus; increased in traumatic inflammatory hyperæmia, but normal in erythema medicamentosum and in syphilitic roseola; diminished in prurigo, psoriasis, eczema, herpes, and pemphigus; absent in erysipelas.

Hyperidrosis of the palms, the soles, and the axillæ are the conditions for which relief is commonly sought. The sweating in these regions may be slight, keeping the surfaces merely moist, or it may be so profuse that the sweat runs from the surface in little rills. It is a common observation that in persons stripped for a medical examination, especially before an audience, as in our clinics, there is profuse hyperidrosis of the axillæ, and Aubert has shown that there is in these cases an actual rise of temperature of half a degree or more in the axillæ. Hyperidrosis of the palms and soles is most common in young people and is generally associated with indications of a feeble circulation—want of general tone, cold and bluish extremities, pale complexion, etc. In bad cases the surfaces are so constantly bathed in fluid that the epidermis acquires the shriveled and shrunken appearance common to the hands of washerwomen, but even in mild cases the horny layer has a peculiar translucent, lusterless appearance, due to its soaking in sweat. Sometimes the macerated epidermis peels off in flakes, and considerable pain and discomfort in walking result when the disease affects the soles. The borders of the soles are sometimes reddened, and blebs occasionally form after much walking. Hyperidrosis often precedes or accompanies tylosis palmæ.

Treatment.—From what has been said as to the vagueness of our knowledge of the causes underlying hyperidrosis, it must be evident that our treatment of this condition must be largely empirical. In former times the suppression of this natural secretion was very much feared as likely to produce internal disorders, but we know now, especially since the experiments of Senator, that no ill results follow the suppression of the sweat, even after so radical a method as varnishing a large part of the surface involves. The process of tar-and-feathering as carried out occasionally in outlying communities in this country demonstrates also the complete innocuousness of absolutely prohibiting the perspiration at least for many hours over the entire surface. Dermatologists have therefore sought for remedies for checking excessive perspiration without fear of any evil consequences attending their application. In the treatment of a given case every possible deviation from normal health must be sought out and measures directed toward correcting it. Anæmia, chlorosis, disorders of menstruation and of the digestive function, are the most common conditions associated with hyperidrosis. Iron, quinine, cod-liver oil, mineral acids, and the bitter tonics may be suggested. In addition to the measures suitable for correcting any general disorder, atropine (in doses of $\frac{1}{150}$ to $\frac{1}{20}$ grain three times a day), which has a distinct inhibitory action on the secretory fibers, may be tried. Its use is rather indicated in general hyperidrosis, like that of phthisis, but it is sometimes of value in circumscribed hyperidroses. Unfortunately, the good effects sometimes following its exhibition are only temporary, and it soon loses its power to control sweating. Among a host of other remedies which have been essayed, aconite (1 to 3 drops of the tincture three times a day), sulphur (a teaspoonful of the precipitated sulphur in milk twice a day, specially recommended by Crocker), ergot (extr. ergot, fl. ʒ ss. or more three times a day), and agaricine ($\frac{1}{6}$ grain t. i. d.) may be useful in some cases.

The *local treatment* consists chiefly in the use of dusting powders and astringents. Powders of tartaric acid, subnitrate of bismuth, boric acid, starch, etc., may be employed; salicylic acid, one part, with talcum venetum, five parts, is one of the most generally useful. An excellent method of treatment for hyperidrosis pedum consists in bathing the feet every night in a strong solution of boric acid, and, after drying, rubbing into the soles the talcum-salicylic-acid powder, dusting the shoes and stockings (the latter should be changed every day) freely with the powder, and wearing cork soles, of which several pairs should be provided, so that they may be dried and sterilized in an oven or soaked over night in strong boric-acid solution and dried before using. Duffin's modification of Hebra's method of treatment of hyperidrosis pedum also yields excellent results, but is more troublesome. The feet are to be carefully strapped with lead plaster once a day for a fortnight; at the end of this time the epidermis peels off in large flakes and the patient is generally cured. For the after-treatment dusting powders should be used. In the German army a favorite method of treatment for tender feet is to rub them thoroughly every night with mutton suet containing two-per-cent salicylic acid. In very obstinate cases painting the palms or soles with a five-per-cent chromic-acid solution may be tried; it always stops the sweating at least for several days, and sometimes cures permanently. The application may be made every ten or twelve days, but great care must be exercised lest there be any rhagades or cracks in the epidermis, as lymphangitis with serious consequences may result.

Inunctions of belladonna ointment have been highly recommended. Washing with astringent lotions, one or two per cent of alum and tannin, or one per cent of quinine in alcohol, is sometimes useful. Daily ablutions with medicated soaps, such as carbolic acid, tannin, or terebene, may be employed. Faradization of the parts has sometimes been useful. To check hyperidrosis axillarum for a few hours (an expedient for which ladies about to attend an evening entertainment may be very grateful) a good plan is to hold a sponge wet with water as hot as it can be borne in the axillæ for a minute; after drying, dust on salicylic-acid-talcum powder, or sponge with one per cent quinine in cologne water.

ANIDROSIS. (S. Pollitzer.)

Definition.—A disturbance in the function of the sweat glands, in which perspiration is absent or greatly diminished in quantity.

In a strict sense of the word, anidrosis implies the complete absence of sweat, but it is convenient to use the term also to denote a marked diminution. The disorder may be local or general; it may be congenital or acquired; there may be a slight diminution, or there may be a complete absence of sweat. It is congenital in ichthyosis, and there are many people who for no apparent reason sweat but little or not at all under conditions—e. g., the Turkish bath, under which most people sweat profusely. The disorder is symptomatic in many conditions, as in diabetes and albuminuria, and it occurs regularly at one stage in fevers. Anidrosis over circumscribed areas is due to direct injury to the sweat glands or to interference with their enervation *in loco*, in the course of the nerve trunks or in the cord. Sweating is absent in the atrophic patches of anæsthetic leprosy, in diffuse or circumscribed scleroderma, in eczema, and psoriasis, and some other skin diseases. It is often absent in injuries of nerve stems—e. g., the brachial or lumbar plexus, in the parts supplied by the nerves—and in the glossy skin following a nerve lesion the secretion of sweat becomes less and less until there is complete anidrosis. There is temporary anidrosis in many tropho-neuroses—e. g., hemiatrophy (Virchow) and infantile spinal paralysis, in which, with the return of electrical irritability and motility of the parts, the secretory function of the glands is restored. The disorder occasions no disturbance, though those who are affected by general anidrosis are said to be rendered uncomfortable when placed under conditions which commonly occasion sweating, such as hot weather, the Turkish bath, etc.

The condition rarely requires treatment. Measures aimed at stimulating the secretion and increasing the metabolism of the skin—such as shampooing in the Turkish bath, massage, pilocarpine, etc.—may be tried when for any reason it is desirable to treat the condition.

BROMIDROSIS. (S. POLLITZER.)

Synonym: Osmidrosis.

Definition.—A disturbance in the function of the sweat glands, in which the perspiration has a marked odor when secreted, or acquires it soon after.

In the great majority of cases the offensive odor is due to decomposition of the macerated epidermis and of the sweat after secretion. It was for a time doubted that sweat ever has *per se* any marked odor, and, though we know now that peculiar odors may be intrinsic in the sweat, it must be admitted that such cases are very rare. The older physicians who lacked our instruments of precision in diagnosis, and therefore paid closer attention to the phenomena which appealed to the unaided senses, recognized certain odors as characteristic of various general diseases. Rheumatic, puerperal, and typhoid fever, syphilis, scurvy, scrofula, etc., were said to have each its characteristic odor, which was described as sweet, sour, resembling that of stale beer, freshly baked bread, wet straw, etc. However fanciful such observations appear to us, it can not be doubted that the composition and the quantity of sweat vary in different diseases, and therefore its decomposition products will vary in their character and in their odor. Hammond (On Odors in Connection with the Nervous

System, N. Y. Med. Rec., 1877), Monin (Abstr. in Amer. Jour. Cut. and Ven. Dis., 1885, p. 211) and others have recorded the occurrence of agreeable odors of the sweat, resembling those of violets, pineapple, etc., in certain nervous disorders, and I have observed a case of a penetrating, disagreeable odor, lasting half an hour, in a gentleman who perspired freely under the emotions evoked by an embarrassing position.

Bromidrosis which usually demands our attention is that affecting the feet or the axillæ. The former is most common in young people and in those whose occupation requires them to do much standing, like domestic servants, barbers, etc. It is always associated with hyperidrosis, and there is no doubt that the foul smell is due to decomposition of the sweat and the macerated horny layer after the fluid is secreted. Bacteria in great variety may be readily demonstrated in the sweat in these cases. Thin attributes the odor to the action of a germ which he calls *Bacterium fœtidum*, but it is probable that the decomposition is due to the presence of many different organisms. In bad cases the odor is so penetrating as to make itself perceptible through the coverings of the foot, and the sufferer is obliged to shun society and is unfitted for indoor occupations. The surfaces affected have a sodden macerated appearance due to the hyperidrosis.

Treatment.—The treatment of bromidrosis is identical with that of hyperidrosis. In cases of bromidrosis axillarum in which there is but little hyperidrosis, sponging with cologne water containing sublimate in the proportion of 1 to 300 is generally effectual, at least for some hours.

CHROMIDROSIS.* (S. POLLITZER.)

Definition.—A disturbance in the function of the sweat glands in which the perspiration is colored.

Cases of this rare affection may be divided into two forms—those in which the abnormal secretion is due to a disturbance in the glands or their nerve mechanism, and those in which the color depends on the excretion of some substance taken into the system by the mouth or otherwise. We may divide chromidrosis, therefore, into the idiopathic and accidental forms. The so-called red sweat which occurs in warm, moist regions like the axillæ and genital regions is due to the growth of micro-organisms (according to Babes [Centralblt. f. med. Wissensch., 1889, No. 9], *Bacterium prodigiosum*) the colonies of which have a red color. It is nearly always associated with the concretions on the hairs called lepothrix. The affection has nothing to do with the secretion of sweat, and is no more to be regarded as a form of chromidrosis than is the discoloration of the skin due to the wearing of a red flannel shirt.

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* Cf. Le Roy de Méricourt, Mémoire sur la chromidrose, Paris, 1864, and references in the text.

In *idiopathic chromidrosis* the color is usually black or brownish black, or may be some shade of dark blue. In some cases the color has been seen to change from blue to black, from blue to yellow, or from yellow to black. In occurs in small patches, sometimes distributed symmetrically over the body. In the great majority of cases the orbital region, especially the lower lid, was affected. It has been seen on the cheeks, forehead, and side of the nose, and more rarely on the chest, abdomen, back of the hands, axillæ, groin, and popliteal space. The patch of discoloration develops either rapidly or gradually, and the secretion forms a fine granular deposit on the skin, from which it can be readily removed with the aid of glycerin, chloroform, or ether, but not with water. The deposit is sometimes largely composed of fat, and it contains amorphous granules which have been supposed to be indigo, but do not give the reactions for that substance, nor have the chemical examinations made yielded any but negative results. The amount of pigmentation varies on different days and in the same case in the rate at which it is formed at different times. The affection may disappear after a few weeks, but it often persists for several years. Nearly all the cases have occurred in young unmarried women suffering from menstrual disturbances and chronic constipation. In most of them there were well-marked signs of hysteria, and, indeed, this peculiar affection may be looked upon as one of the manifestations of hysteria. Parrot (2° Dict. encyclop. des sci. méd., Paris, 1875) regards the affection as an hysterical neurosis of the glands, a view in which Besnier and Doyon and Crocker share.

No histological examination of the affected glands has ever been made, and a doubt as to whether the disordered secretion originates in the sudoriparous or in the sebaceous glands would appear not unjustifiable. According to Crocker (Diseases of the Skin, 2d ed., p. 722), there are two forms, the *sebaceous* and the *sudoriparous*; in the first the discoloration forms slowly, in the last rapidly. The disease is extremely rare; no case has ever been seen in the great dermatological clinics of Paris, Lyons, and Vienna, and, as some of the cases have undoubtedly been impostures, the existence of the disease has been questioned, but competent observers have been eye-witnesses to the development of the discoloration. (Cf. case reported by Colcott Fox, Clin. Soc. Trans., 1881, and Report of Committee).

The *treatment* should be directed to the removal of the concomitant constipation, uterine disorder, or anæmia; local measures appear to have no effect.

In *accidental chromidrosis*, in which the color is due to the excretion through the sweat glands of susbtances taken into the system, the color may be green, blue, or red. *Green sweat* occurs quite commonly in workers in copper, particles or fumes of which enter the system by the food, drink, or air; sometimes the color is bluish rather than green. The colored sweat is at times very abundant, and may stain the hair and underclothing. That the coloring matter is not extraneous appears from the fact, stated by Tilbury Fox, that it develops in copper workers on Sundays, notwithstanding the hot bath of the previous night. In a case of blue chromidrosis in which the patient had taken much iron Scherer found the protosulphate of iron in the sweat. In a case of G. H. Temple (Brit. Med. Jour., Aug. 29, 1891) there was a profuse pink-colored sweat in a patient who had taken potassium iodide, the hair as well as the skin being stained. The pseudo-red sweat due to micro-organisms has already been referred to.

Hæmatidrosis, or **Ephidrosis cruenta,** consists of a hæmorrhage from the sweat-pores. The blood is probably extravasated into the sweat glands and reaches the surface through their ducts. It is therefore, properly speaking, not a disorder of sweating. The disease is extremely rare, and most of the cases reported are impostures, or are hæmorrhages from the skin rather than from the sweat pores; but the experiences of Wilson, Hebra, Parrot, Wagner, and others leave no doubt as to the reality of the affection. Parrot (Gazette hebd. de méd., 1859, pp. 633, 644, 678, 713, 743) has shown the disease to be of nervous origin, and places it in the category of hysterical phenomena. The region affected is limited in area and different in different cases; face, ears, umbilicus, hands, and feet have been affected. The hæmorrhages occur chiefly in hysterical young women during violent emotion, and sometimes associated with amenorrhœa. The hæmorrhages into the skin and alimentary canal which occur sometimes in the new-born are probably due to the great changes in the distribution of the blood which take place at birth, and do not belong to this class.

Phosphorescent sweat has been observed in a few cases. Phosphorescent pus, urine, and semen, when phosphorus is taken internally, are not uncommon. Luminous sweat has been ascribed to a fish diet, and a case (cf. Carpenter's Physiology, 1869, p. 500) is recorded in which the body linen became luminous after violent sweating. It is not unlikely that the phenomenon is due to the action of photophoric bacilli, many varieties of which have been described.

URIDROSIS. (S. POLLITZER.)

Urea in minute quantity appears to be a normal constituent of the sweat. In certain conditions it may become sufficiently abundant to leave a deposit on the skin and to diffuse through its decomposition products a pronounced odor of urine. The odor of urine in the sweat very frequently accompanies uræmic conditions, and has also been noticed in cases in which the kidneys seemed to functionate normally. The excretion of urea through the skin is sometimes so abundant in cholera, in atrophy of the kidneys, and in the sweating in articulo mortis, even where there is no kidney disease, that a whitish granular or flaky deposit of the salt (oxalate?) remains on the skin when the sweat evaporates. It would be incorrect to assume, however, that the sweat glands are vicariously substituted for the kidneys; with an abnormally large quantity of so diffusible a substance as urea in the blood we should *a priori* expect to find it in all the fluids of the body. There is no evidence that other constituents of the urine—e. g., sugar, albumin, etc.—pass through the sweat glands; on the contrary, the phosphates and chlorides normally in the sweat appear to be diminished in cases of uridrosis.

THE ORGANIC DISEASES OF THE SWEAT GLANDS.

(S. POLLITZER.)

These include Hypertrophy, Atrophy, Inflammation, Miliaria Rubra, Crystallina, and Profunda (Hidrocystoma), and Adenoma.

Hypertrophy and **Atrophy** of the glands are of little clinical interest. They occur as the result of disturbed nutrition of the skin, and may include only small areas or be spread over large tracts of skin. Hypertrophy occurs chiefly as the result of excessive function or excessive nutrition. The volume of each gland is increased in some chronic constitutional disorders like phthisis, scrofula, articular rheumatism, etc.; and in most chronic affections of the skin—prurigo, eczema, elephantiasis, lupus, syphilis, etc. Hypertrophy of the glands may or may not be associated with excessive function; so in phthisis there is hyperidrosis, while in elephantiasis the sweat may be diminished in quantity.

Atrophy of the sweat glands is most commonly the result of inhibited nutrition. The glands under callosities, corns, and cicatrices are reduced in size or sometimes entirely absent, and they may atrophy under trophoneurotic influences.

Virchow has described a form of fatty degeneration of the glands in phthisis, and it is probable that similar changes take place in the acute and chronic febrile diseases like typhoid, pyæmia, etc. It is possible that inflammatory affections of the sweat glands occur with resulting atrophy, or fatty, hyaline, or colloid degeneration, as Geber (Ziemssen's Handbuch) describes; but these changes have not actually been demonstrated under the microscope. We have positive knowledge, however, of one form of inflammation which terminates in suppuration and complete destruction of the gland, and we shall describe this first.

HIDRADENITIS SUPPURATIVA. (S. POLLITZER.)

Definition.—A suppurative inflammation of a sweat gland resulting in its destruction and the production of a scar.

An excellent clinical description of the disease was given by Verneuil (Arch. Gén., 1864, ii, p. 537; 1865, i, p. 327) in 1864, under the title of Hydrosadénite Phlegmoneuse et Abcès Sudoripares. Velpeau (Diction. de Méd., 2me ed., 1835–'39, articles Aisselle, Anus, Mammelles; and Clinique Chirurg., t. ii, p. 133) and others had previously described a form of the affection as it occurs in the axilla, near the anal orifice, and at the nipple, without, however, fixing the anatomical seat of the disease. The disease described by Barthélemy * under the name of *Acnitis*, and the case of Acne Varioliformis of the Extremities by Bronson and Fordyce (Jour. Cut. and Genit. Dis., 1891), are identical with hidradenitis. Dubreuilh (Arch. de méd. experim. et d'anatomie pathol., i, 1893) has recently described several cases.

Symptomatology.—The lesions may be single or multiple. They occur most commonly in the following regions, generally singly: axilla, anus, nipple, scrotum, and labia majora; and in these regions their treatment falls into the domain of the surgeon. The evolution of the lesion here, however, does not differ from its course when the disease is disseminated over the general integument. Sweat glands occur everywhere in the skin, and the lesions of this disease may therefore develop at any point on the integument, though it would appear that no case involving the planta pedis has yet been observed. In the disseminate form it is most commonly located on the face and neck, the extremities, or the trunk. The lesions may vary from a few in number to a hundred or more.

The lesion begins as a deep cutaneous nodule which does not at first involve the superjacent tissue, feels like a bird-shot imbedded in the subcutaneous tissues, is painless on pressure, and occasions no subjective symptoms. It enlarges slowly, and by the end of one or two weeks attains the size of a pea and produces the appearance of a small, round tumor. The skin over it is now reddened in color, no longer freely movable, and pressure on it is slightly painful. An incision into the tumor will be followed by the extrusion of a drop or two of pus. If it remains undisturbed, the middle of the tumor appears yellowish in the course of a few days, the epidermis breaks down, and a drop or two of creamy pus with a little blood and small shreds of tissue flows from one or more minute openings. If the secretion be not removed, a discolored adherent crust is formed, which falls off after a few days, and a dark-reddened skin under it remains pigmented for many weeks, a slightly depressed scar ultimately marking the site of the tumor. Sometimes several nodules develop simultaneously in close proximity to each other, coalesce, and form firm, flat tumors of considerable size, which discharge through many minute openings. Sometimes the small, shotty nodules do not increase in size and undergo suppuration, but remain unchanged for many months and finally become absorbed. As all the lesions do not develop synchronously, there will be present at any time during the course of the disease the round, nodular, reddish, or yellow elevations, small discolored crusts, pigmented patches, depressed round or oval scars, and hard subcutaneous nodules. The disease is extremely chronic, lasting sometimes for years.

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* Ann. de Dermat. et de Syph., ii, 1. Barthélemy denies this, but whoever will take the trouble to compare his excellent clinical description with that of Verneuil, and Darier's microscopic description of Barthélemy's case with mine (Jour. Cut. and Genit. Dis., 1892), must be convinced of the absolute identity of the two diseases.

Anatomy.—The tumors consist of a dense aggregation of small, round cells, epithelioid cells, and large multinuclear masses resembling giant cells. The round cells are distributed throughout the entire tumor, but are most abundant at its periphery. The epithelioid cells show a rough tendency to a distribution in groups. The giant cells are extremely numerous, of great variety in size and shape, and occur in distinct clusters. They differ from the typical formative giant cell in that they are of more regular outline; the nuclei are distributed less regularly, and sometimes faint tracings like the contours of cells appear in them. Sweat glands are absent from the middle of the tumor, but toward its border glands with swollen and englutinated cells, whose nuclei do not take stains well, may

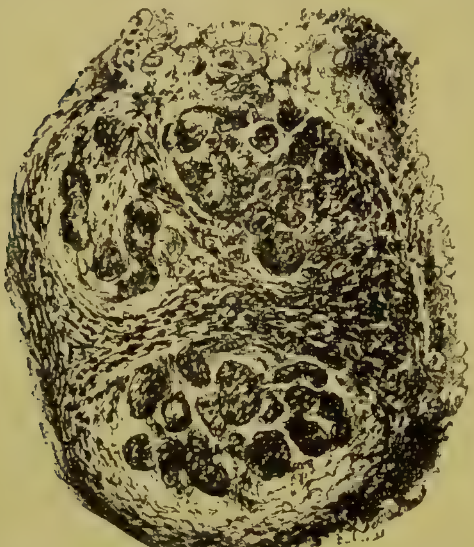


FIG. 80.—Hidradenitis. Parenchymatous degeneration of glomerulus.

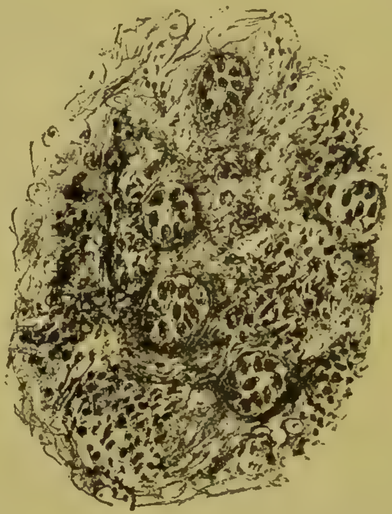


FIG. 81.—Hidradenitis. Pseudo-giant cells.

be seen. The epidermis in the unbroken tumor shows no change of any importance. The hair follicles are unaffected. The endothelium of the blood vessels is swollen and may occlude the lumen of the capillaries.

Pathology.—The pathological process is an acute diffuse inflammation of the sweat gland and periglandular tissue, terminating in suppuration and destruction of the gland. It begins probably as a parenchymatous inflammation affecting one or more glands. The diseased glands induce irritative changes in the blood vessels and emigration of white blood-corpuscles. The latter invade the parenchyma of the gland, and its degenerated epithelium is broken up into fragments which become separated by the dense infiltration, in the midst of which they are finally found as masses resembling giant and epithelioid cells. Whether the disease is of infectious origin or whether the degeneration of the gland is brought about by the excretion through it of some toxic agent has not been determined. Bacteriological investigation made by Darier and by myself yielded negative results. Crocker (Dis. of the Skin, London, 1893, p. 189) describes the disease as a variety of furuncle, but there is no ground, clinical or pathological, for this association.

Etiology.—We know nothing as to the causes of the disease. Verneuil mentions as etiological factors uncleanliness, cold, irritating applications, parasites, etc.; and among the systemic causes, dyspepsia, constipation, pruritus, scrofula, cachexia, etc. The disease affects both sexes equally, and is more common in young adults than at the extremes of life. In Crocker's (*l. c.*) experience the disease is connected with hyperidrosis.

Diagnosis.—Acne, acne cachecticorum, furuncles, tinea barbæ, and syphilis may be considered.

In acne there are comedones and pustules through the apex of which a hair passes. The subcutaneous nodule of hidradenitis does not occur in acne.

Acne cachecticorum occurs in strumous individuals, is usually accompanied by lichen scrofulosorum, and the lesions consist of distinct pustules surrounded by an erythematous halo.

Furuncles are accompanied by severe inflammatory symptoms and great pain. They form prominent conical elevations, and terminate with the discharge of a central necrotic mass.

Tinea barbæ may be suggested when the disease is limited to the region of the beard. The noninvolvement of the hairs and the absence of the fungus would exclude this affection.

Syphilis, in the form described by Bazin as "syphilide gommeuse," has many features in common with hidradenitis. Indeed, Bazin regarded this syphilide as developing in the sweat glands. The syphilitic differs from the suppurative hidradenitis in that in the former the nodule breaks down rapidly in the middle and produces a persistent ulcer with the usual characters of a syphilitic ulcer.

Prognosis.—The disease tends to spontaneous cure, though it may last for years. The patients may become irritable, and even considerably reduced. When the disease complicates a pre-existing pathological state, like diabetes, tuberculosis, or Bright's, the added drain on the patient's strength may become a serious matter.

Treatment.—We are unfortunately unable, except in an indirect manner, to contribute much to the cure of this disease. In the absence of definite knowledge of its cause the treatment must be conducted on general principles. Tonics are indicated in most cases; iron, quinine, and arsenic may be useful. The bowels should be regulated. In short, any deviation from a normal state of good health should be corrected. As to local treatment, it will be well to incise each nodule as it forms, and to make use of frequent antiseptic baths, or to wash the affected region with a lotion of salicylic acid or sublimate in alcohol. Unna's mercurial carbolic plaster has seemed to me useful, but the disease is at best extremely chronic and the patience of both physician and patient will be sorely tried.

MILIARIA RUBRA. (S. POLLITZER.)

Synonyms: Prickly Heat; Lichen Tropicus; Miliaria Vesiculosa; Miliaria Papulosa; Eczema Sudamen; Fr., Miliaire; Ger., Schweissflechte.

Definition.—An acute erythematous pruritic affection occurring in the summer time and due to obstruction of the sweat-gland ducts in the lower layers of the stratum cornuum.

The disease occurs during the hot season of the year and affects those who perspire a great deal, especially, therefore, the corpulent and those who dress too warmly. It may affect almost any portion of the surface, but its seat of predilection is the chest, the back, the abdomen, and the arms. Natives of tropical countries are seldom affected by the disease, but those of temperate countries residing in the tropics are especially prone to it.

Symptomatology.—The onset of the disease is sudden; following some unusual exertion, a hearty meal, or an indulgence in hot or alcoholic drinks, the patient finds a considerable area of his skin hot, red, and intensely pruritic. A close examination of the affected region will show it to be studded with countless minute vesicles from a pin's point to a pin's head in size, filled with a clear fluid and surrounded by a zone of redness. Here and there minute pin's-point papules may be seen; sometimes their number is proportionately very great, and the disease has then been called miliaria papulosa, but as a rule the vesicles greatly preponderate. The vesicles are discrete and never at any stage of the process coalesce. In the course of a few days the contents of many of them become cloudy and the vesicle assumes a milky hue, hence the name *miliaria alba.* The vesicles do not rupture spontaneously as they do in eczema, but if they are scratched a minute crust forms which falls off after a few days. There is never any general "weeping." If the process comes to an end with a single eruption, the disease runs its course in about a week, but as a rule there is a constant succession of fresh eruptions as long as the hot weather lasts. The general health of the patient is not affected, but the violent tingling and itching are almost intolerable. While the rash is out, anything that promotes sweating—exercise, a glass of wine, a cup of tea—brings on a sudden and violent attack of itching. Injudicious treatment of the irritated surface may provoke the development of a true eczema, but this is very rare. An ocean trip, a few days in the mountains, or a spell of cool weather may put a stop to the process at once. The disease is apt to recur every summer in those who have once had it.

Anatomy.—The chief changes affect the epidermis. Scattered through the rete there are cyst-like spaces, oval or circular in outline. They are sections of dilated sweat ducts. Sometimes several cysts appear arranged in a line, one over the other, when the section has cut the dilated spiral canal at several points (Fig. 83); sometimes a single cyst occupies the upper layers of the rete, while below it the section of a slightly dilated sweat duct may be seen (Fig. 84). The contents of these cysts may be either wholly fluid, or cellular elements may be present in considerable numbers, or the space may be filled with closely packed epithelial and round cells and fragments of nuclei. The relation of these cysts to the sweat duct, especially when there is but a single one in the thickness of the rete, is not always apparent, and serial sections may be necessary to demonstrate its connection with the duct. Török (Review in Monatsh. f. prakt. Dermat., Bd. xiii; the paper is published in Hungarian, but Török has communicated his views to me by letter) could not find any connection between the vesicles and the sweat duct. He finds colliquative changes in the epidermis, and believes the vesicles to be of inflammatory origin, the result of irritation from the sweat on the surface. Robinson (Jour. Cut. and Genit. Dis., 1884) believes that there is inflammation about the sweat pore,

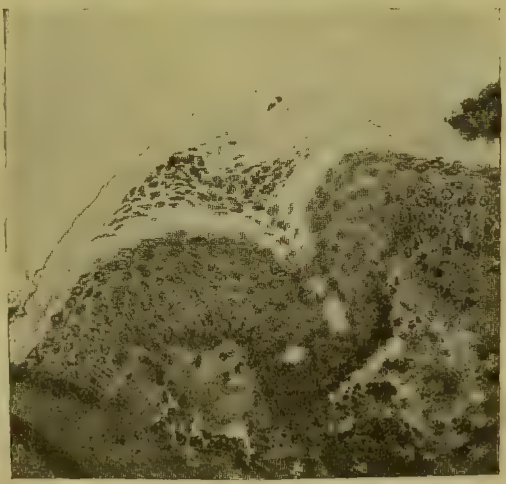


Fig. 82.—Orifice of sweat duct; swollen horny layer with nuclei preserved.

but that the process is an eczema. My own observations (Jour. Cut. and Genit. Dis., 1893; also The Miliaria Group, New York Med. Jour., 1894) are based on the microscopic study of eight cases in different stages. I believe that serial sections will show most of the vesicles to be dilated sweat ducts. It is of course possible, however, that the hyperæmia in the papillary layer may lead to exudation of serum with the formation of a vesicle in the epidermis, and I have seen such vesicles in the same sections that showed duct vesicles, but I do not regard this as anything more than an accidental epiphenomenon. The clinical appearance of papules is accounted for microscopically by the occurrence of cysts filled with cellular elements; second, by minute clear cysts in the lower regions of the rete, if they do not produce much tension of the superjacent epidermis; and, finally, by the circumscribed swelling of the horny layer in the immediate neighborhood of the sweat pore.

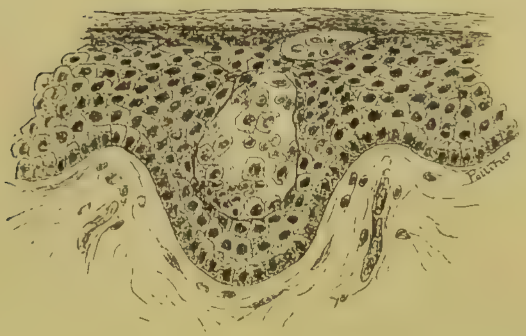


FIG. 83.—Dilated spiral duct cut at two points.

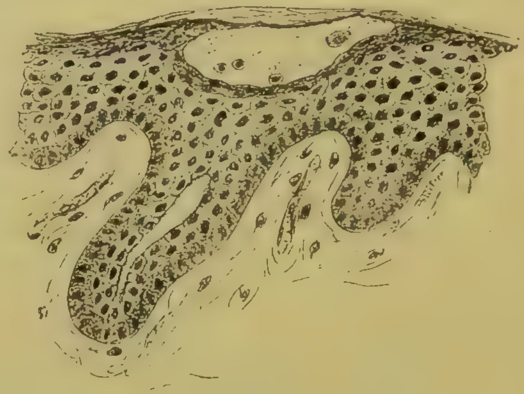


FIG. 84.—Cyst below horny layer, dilated duct below it.

The horny layer is swollen, and its cells, instead of appearing as thin lamellæ, have the vesicular appearance characteristic of the horny layer of mucous membranes, and, like the latter, the nuclei of the cells, especially near the orifices of the sweat ducts (Fig. 82), are often well preserved. The vessels in the papillary layer appear well filled with blood, and there is a moderate amount of leucocyte infiltration around them. The glomeruli of the sweat glands appear normal except, perhaps, that their lumina seems sometimes unusually wide.

Pathology.—The disease is due to an occlusion of the sweat duct in the horny layer. How this occlusion is brought about we can not say with certainty, but the appearances of the horny layer afford some basis for a theory. It seems likely that the cells of the horny layer, bathed in perspiration, fail to cornify completely, imbibe water, and, swelling up, close the orifices of the ducts at a time when the discharge of sweat is momentarily in abeyance. The next flow of sweat through the ducts, unable to escape, causes a dilatation of the canal at a point just below the obstruction. As the secretion of sweat continues, the cystic dilatation must grow larger, and there will result a funnel-shaped spiral canal in the epidermis. Inasmuch as all persons sweat in summer, and but few acquire prickly heat, and then not over the entire integument, we must assume some other factor to account for this immunity. I have sought (*loc. cit.*) this factor in the different degree, in different individuals, and in different parts of the body, to which the horny layer is impregnated with fat; cells permeated with fat will not absorb water, will not swell, and therefore will not occlude the ducts. And we know that in regard to its natural lubrication the skin in different parts of the body and in different individuals varies greatly; it is well known that in negroes and in Southern people generally the skin is particularly well oiled. It is probable that there is secondarily a local vaso-motor disturbance, and from the congested corium the watery elements of the blood, permeating the epidermis, aid in aggravating and in maintaining the disordered condition. That the disease is not an eczema is clear from the study of its histology. On clinical grounds there is not less reason for differentiating the two affections. No eczema would, like prickly heat, remain unchanged for months in the erythemato-vesicular stage without weeping and crusting, and this often in the face of such irritative treatment as frequent bathing; nor do we know of any eczema that, after existing for months, will disappear like prickly heat in twenty-four hours almost without a trace.

Etiology.—We have already spoken of the *rôle* which perspiration plays in producing the disease. In infants its most common cause is too warm clothing or irritation from flannel. The disease occurs at all ages, though of course it can not develop in the dry skin of senile atrophy. The very severe forms rarely occur in this climate.

Diagnosis.—The disease bears some resemblance to an acute eczema. In eczema the skin over the patch is uniformly affected; in prickly heat the erythema is patchy, the skin is not uniformly red over the whole area. In eczema the vesicles rupture spontaneously and there is oozing and crusting. Eczema is a persistent, prickly heat a transitory rash. In addition, its occurrence only in hot weather, with peculiar prickling and smarting, and its association with sweating, make the diagnosis of miliaria rubra an easy matter. In children the rash often may give rise to the suspicion of an exanthematous fever, but its limitation to warm covered regions, the accompanying sweating, and the absence of constitutional symptoms should suffice for a diagnosis. It must not be forgotten, however, that prickly heat may be associated with a systemic infection.

Prognosis.—The mild cases yield readily to treatment, but relapses are common. As a rule, the disease lasts through the summer. In children and in the obese intertrigo often develops. In the tropics patients may become much reduced from the constant irritation and the attendant loss of sleep.

Treatment.—The treatment should be directed to soothing the irritated skin and to reducing perspiration. Saline diuretics, the acetate and nitrate of potash, are useful. The bowels should be kept opened and a bland diet enjoined. Violent exercise and heavy clothing must be avoided. Alcohol in any form is particularly bad. Very light woolen clothing is preferable to cotton. Frequent bathing is injurious. Locally the best application is some dusting powder; carbonate of magnesia appears to me one of the best. Calamine lotion or a lotion of boric acid and lead (Ac. boric, 16·0; plumb. acet., 4·0, to a quart of water) gives relief. Scratching only aggravates the trouble, and one of these applications should be used each time the itching is severe. On theoretical grounds I should advise by way of prophylaxis in those habitually affected every summer a daily bath, followed by an inunction of some fat like lanolin and vaseline.

MILIARIA CRYSTALLINA. (S. POLLITZER.)

Synonym: Sudamina; Ger.. Schweissfrieselausschlag; Fr., Miliaire crystalline.

Definition.—An ephemeral rash consisting of small transparent vesicles due to obstruction of the sweat duct at its orifice, and occurring in the course of one of the febrile diseases.

Symptomatology.—The rash develops suddenly, and is most abundant on the trunk. The lesions may be few in number or they may be thickly disseminated over the surface, and they are distributed without any special order. They occasion no subjective symptoms. The vesicles are discrete, and as a rule very minute, but they sometimes coalesce and attain the diameter of a quarter of an inch or more. The color of the skin is not at all changed, there is no red areola around the lesions. The vesicles themselves are perfectly clear, or slightly opalescent in appearance. They rupture spontaneously in a few days and leave no trace other than a very slight desquamation, though successive crops may occur. They occur only in connection with a general febrile disorder and as a rule toward the end of the disease with which they are associated, and most commonly after a "critical" sweat. They are seen oftenest in typhoid, rheumatic, and puerperal fevers. They are absolutely without any diagnostic or prognostic significance in regard to the disease in connection with which they occur.

Anatomy and Pathology.—The anatomy of the sudamina vesicle has been studied by Haight (Sitzungsbe. Akad. d. Wissensch., Wien, 1868), Robinson (Jour. Cut. and Ven. Dis., vol. ii), and Török (abstract in Monatsh. f. prakt. Derm., Bd. xiii). The vesicle lies wholly between the lamellæ of the upper portion of the horny layer. A sweat duct may generally be found leading into it, and the fluid in the vesicle is sweat apparently unchanged. The accumulation of sweat resulting in the formation of the vesicle is due to an obstruction of the duct at its orifice. The cause of this obstruction may be sought in the accumulation of epidermic *débris* incident to the severe constitutional disturbance in connection with which miliaria crystallina occurs. Possibly the nutritive changes in the skin, due to the state of vital depression in which the patient is, producing a modified keratization, are a factor in the development of the obstruction. The stopping up of the pore takes place while the skin is dry and the sweat function is in abeyance. The first outpour of sweat that follows must dilate the duct just below the point of obstruction.

Diagnosis.—The minute clear vesicle, whose appearance has been compared by Hebra to that of a drop of dew; the absence of inflammatory reaction; the irregular dissemination; and the concomitance of a pyretic affection—these are the points which make the diagnosis an easy matter. No treatment is required.

CHRONIC MILIARIA. (S. Pollitzer.)

Under this title Crocker (Brit. Jour. Dermat., 1893, p. 174) describes an eruption which occurred on the palms and soles in an elderly woman, in whom it had existed for a few years, varying in extent and activity, but never wholly absent. The lesions were scattered thickly over the palms, but were less abundant on the soles, and limited to the surface under the arch. It appeared as a "pin's-point-sized pustule seated at a sweat pore and surrounded by a semitranslucent reddish area, the whole lesion being not larger than a small pin's head. The pustular portion enlarged to the size of a millet-seed, still with the narrow areola evidently due to clear fluid beneath the epidermis. This lesion dried up into a horny plaque, about one twelfth of an inch in diameter, with a brownish-red center, and when this was thrown off it left the new healthy skin beneath surrounded by a white scaly color, which was simply the boundary of the cast-off scaly plaque." The disease first appeared at a time when the patient was perspiring a great deal.

A case described by Jamieson (Brit. Jour. Dermat., 1893, p. 134) as "dysidrosis of the face with unilateral hyperidrosis" is a doubtful case of this disease. The case resembled miliaria profunda externally, but it differed in that the vesicles "dry up, scale off, and leave little marks or stains to show where they have been." Histologically there is no resemblance to miliaria profunda at all. The vesicle was located wholly in the epidermis, the appearances resembling those described by Williams (Brit. Jour. Dermat., October, 1891), as characteristic of cheiro-pompholyx, though there were slighter traces of inflammation than he found. "There were no cysts in the corium, but the orifices of the sweat ducts in the epidermis were in some instances expanded into cystlike spaces immediately beneath the horny layer." The sweat glands and ducts otherwise seemed unchanged.

Judging from this histological examination—unfortunately the section did not extend to the deepest coil glands—it is safe to say that the case is not one of miliaria profunda. I would suggest the probability of its relation to the chronic miliaria of Crocker.

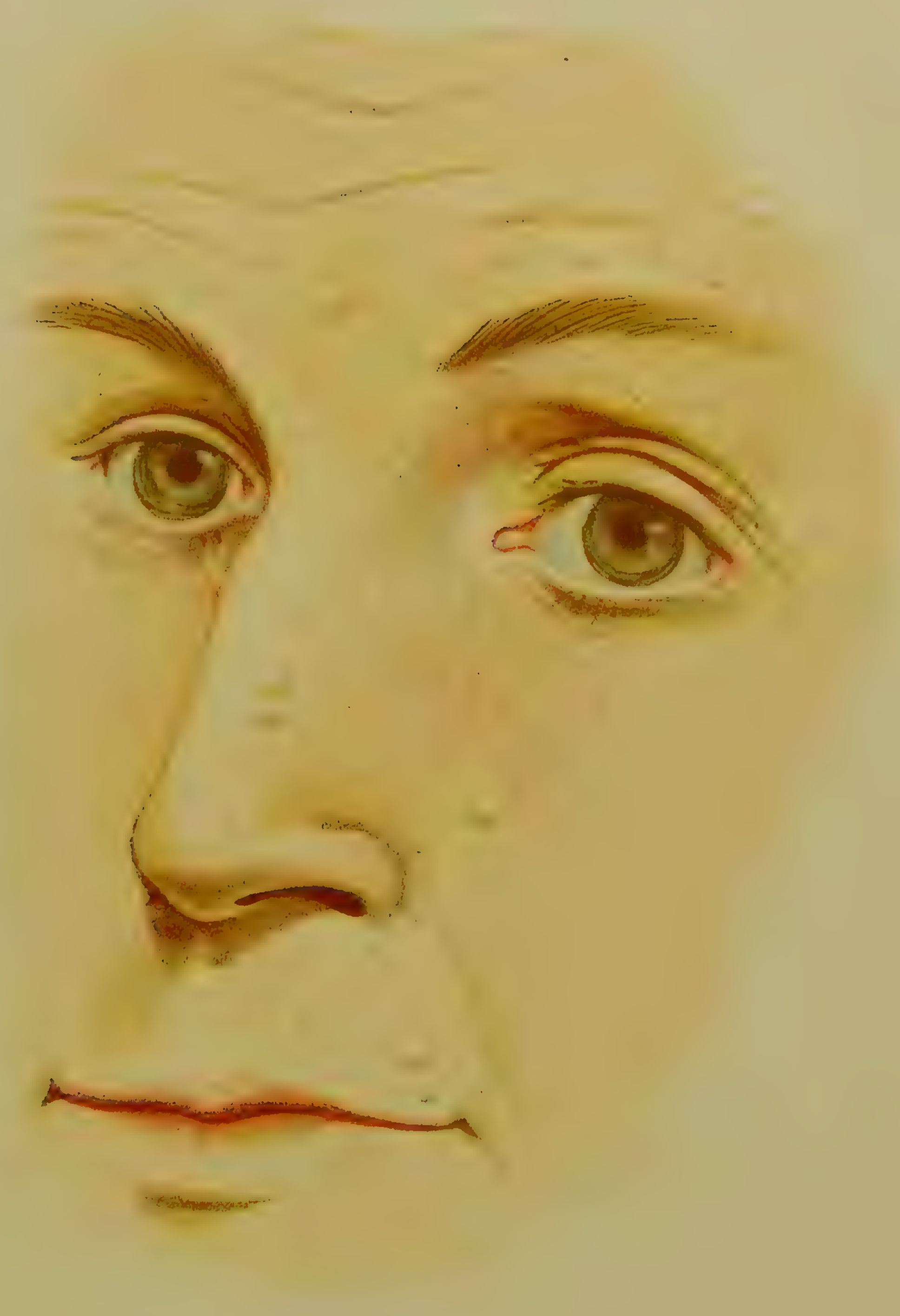
HIDROCYSTOMA. (A. R. Robinson.)

In a paper upon miliaria and sudamina read before the American Dermatological Association in August, 1884, I described, among other forms of lesions having a supposed relationship to the sweat-gland apparatus, a peculiar eruption seen especially upon the faces of women in middle and advanced life who sweat freely upon that part and who expose it to warm vapor, and hence is not infrequently seen upon the faces of washerwomen, although not confined to them. The remarks made by me at that time in reference to this disease were based upon a clinical and microscopical study of several cases, as when the artist drew the portrait I had four patients present for his study; and from the original of this portrait I subsequently, within a few days, removed half a dozen lesions for histological study (Journal Cut. and Ven. Diseases, August, 1893).

Although the eruption had probably been previously seen by other dermatologists, this was the first time that the disease had been studied and described. In my work Manual of Dermatology, published in 1884, I described the disease under the heading Sudamina, and also gave a microscopical drawing showing the anatomical seat and nature of the lesion. Since that time examples of the disease have been described by Drs. G. T. Jackson, Jamieson of Edinburgh, Rosenthal, and Hallopeau, under the designation "dysidrosis of the face"; but as the disease corresponds in no respect with the dysidrosis of T. Fox, the term was not appropriate, and, furthermore, none of these authors except Jamieson made any microscopical examination of the lesions to prove that the condition was the result of a difficult sweating process. The affection is not a very infrequent one in New York city, as I have seen not less than thirty or forty cases since 1884. All of them have been so similar in appearance and history that it evidently constitutes a clinical entity, and therefore, on account of the anatomical character of the lesions, I have called the disease hidrocystoma.

All of the cases which have come under my observation, with one

PLATE XXIV



Hidrocystoma (Robinson).

exception—that of a young man, twenty-eight years of age, in whom the eruption was limited to the lower half of the right side of the nose—have been in women in middle life or older. The rule was that the disease appeared in middle-aged women who habitually perspired greatly, and who did washing over tubs, thus exposing the skin of their face to the action of a warm, moist atmosphere. All of the cases have been worse in summer than in winter, and in many of them the eruption would almost, if not entirely, disappear in winter, while in others it would entirely disappear during cold weather. In a case described by Hallopeau, and in whom the disease was limited to the nose, the eruption was more severe at the menstrual period than at other times, and it appeared to him to be much influenced by the condition of the nervous system, an emotional state aggravating the condition. In this case the eruption was also worse in summer than in winter.

The eruption usually occurs upon the regions occupied by it in the accompanying portrait—that is, it appears upon the lower part of the forehead, the orbital region, the nose, the cheeks, and often the upper and lower lips and the chin. I have not seen it upon the lower jaw or neck, or upon the rest of the body. In a case reported by Jamieson, of Edinburgh, the eruption was confined to the nose and right side of the forehead, temples, and cheek. The woman was forty-five years of age, and perspired freely and easily upon the right side of the body, and only on rare occasions and when much excited, to a slight degree upon the left side. When first seen by Dr. Jamieson there were large beads of perspiration on the right side of the forehead and corresponding cheek, while the left side was absolutely dry.

Symptomatology.—The lesions are either discrete or situated closely to each other, but it is not usual to find them in any considerable number closely crowded together, especially if they are not very numerous. When perhaps one hundred to two hundred lesions are present—and I have seen such cases—then the lesions over a greater part of the affected area may be closely situated to each other, but when few lesions are present they are usually discrete.

The individual lesions appear as tense, clear, shiny vesicles, obtuse, round, or ovoid in form, and varying in size from that of a pin head to that of a pea. They are at first always deep-seated—that is, their base reaches deep into the corium, but, on account of their size, they are also usually more or less elevated above the general surface. The smaller ones, especially, bear considerable resemblance to a boiled sago-grain. The larger lesions sometimes have a darkish-blue tint, which is most marked at the periphery. This is well shown on the chromo-lithograph. From the drying up of the contents, disappearing lesions may have a whitish appearance like that present in cases of milium. I have not been able to recognize with positiveness the presence of an excretory sweat-duct orifice over the central part of an individual vesicle. The skin over the lesions is not inflamed, and there are no signs of inflammation present in any part of the affected region. If the lesion is a large one, slight circulatory disturbance—a mild hyperæmia—is often noticed at its periphery. There are no subjective symptoms, or the eruption may be accompanied by a slight sensation of tension or smarting.

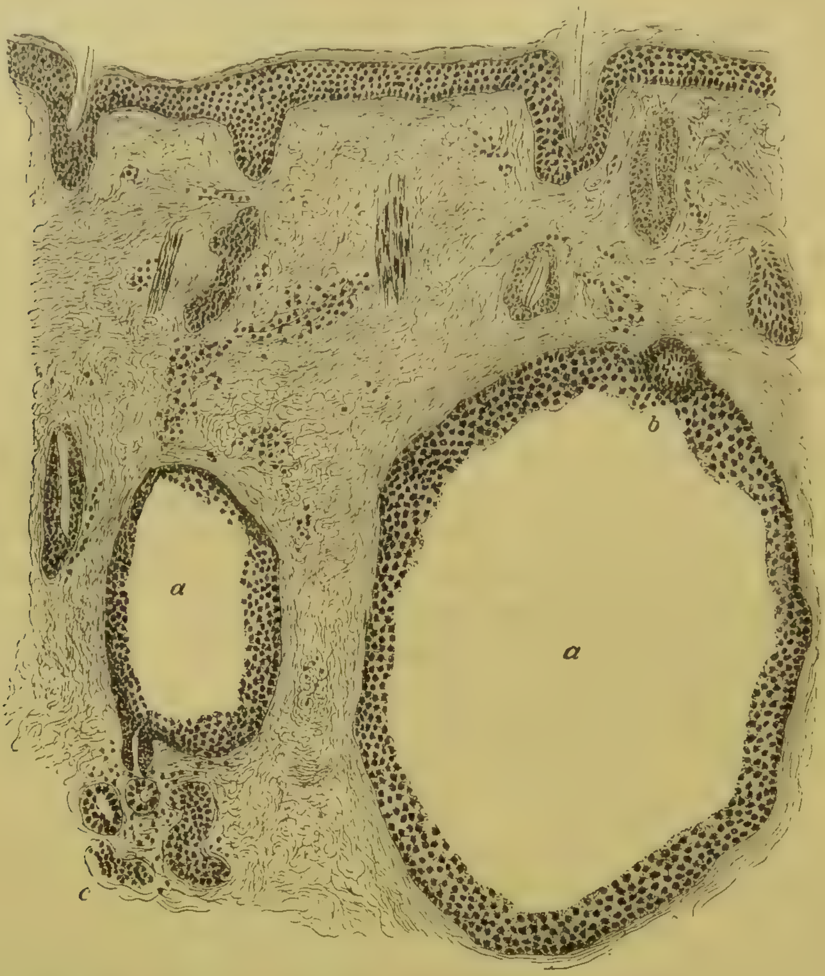


Fig. 85.—*a*, large and small cyst; *b*, excretory sweat duct at place of obstruction; *c*, coil of sweat gland.

The contents of the vesicles are clear and never change to a yellowish color, but dry up and the lesion disappears, unless mechanically injured, without rupture, often lasting one, two, or several weeks, leaving the part in a normal condition or followed by a slight temporary pigmentation. In the late stage of evolution the dried-up contents sometimes appear whitish, giving appearances similar to those of milium. If the vesicles are ruptured, the contents are found to be always slightly acid and never alkaline.

Histology.—In Figs. 85, 86, and 87 are shown the different stages in the formation of the vesicles, and also their topography and manner of origin. The corneous layer and the rete mucosum were in an apparently normal condition, the sweat gland passing through it was normal, and in no part were there signs of vacuolation or of a degenerative process, or of an excessive transudation of serum into or between the cells. The papillary layer was normal in the early stages, but if the lesion became large-sized and approached the rete, as in Fig. 87, the circulation was more or less interfered with from pressure, and consequently a few more perivascular leucocytes than normally are seen were present. The sebaceous glands and hair follicles were normal. In Fig. 87, which represents a well-developed lesion, a portion of the vesicle lies in this part of the corium.

In the lower part of the corium and in the subcutaneous tissue, besides normal sweat glands and hair follicles, the following abnormal conditions were found: The secreting portion of some of the sweat glands have an enlarged lumen from dilatation of the tube and contraction or compression of the epithelial cells against the basement membrane, the lumen being filled with liquid and a granular material resembling that usually seen in normal glands, but in increased amount. Other glands showed granular contents without any enlargement of the tubes or dilatation of the lumen. With the exception of those few with enlarged coil tubes, and those ducts connected with the cystic formations of the sweat glands, both the secretory and excretory portions appeared to be normal. In Fig. 86 is represented a condition met with in a gland having an enlaged coil tube and dilated lumen. The drawing shows a portion of an excretory duct situated a short distance above the coil portion of the gland. The part of the duct represented shows some dilatation of the duct and lumen the entire length, the change being most marked the farther distant from the coil part.

At *a* the duct is cut across somewhat obliquely, but the size of the lumen is easily recognized as being much wider than in the normal condition, and the contents are abnormally granular in character. As there was no cyst directly above this dilated duct and within the excretory duct area in any of the sections examined, it is evident that in Fig. 86 is to be seen a very early stage in the formation of the vesicular lesion of the disease. Judging from this gland alone, it would seem that the lesion arises from obstruction within the lower part of the corium, to the passage to the free surface, of the contents of a sweat gland.

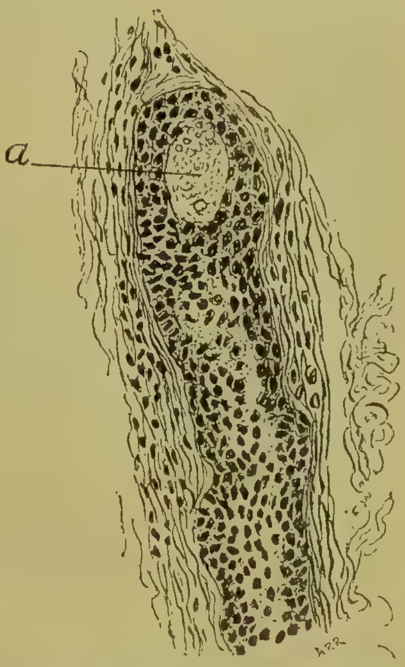


Fig. 86.—Early stage of cyst formation: *a*, seat of earliest formation.

In Fig. 85 is shown a section which included two lesions in different stages of development, and also the connection of both with sweat glands, in the smaller lesion the duct entering at the base of the vesicle, and in the larger one leaving it at the upper part. By studying Figs. 85 and 86, it is easy to see that the vesicles arise from a cystic dilatation of the excretory sweat duct lying within the corium. On the left half of the drawing (Fig. 85) is seen a small cyst connected with the sweat gland *c*, and on the right half of the drawing is a much larger cyst connected with the excretory duct seen cut transversely at *b*. At *c* is seen the coil portion of the gland. Nothing abnormal was to be observed, unless it was that the contents of the lumen were more granular than usual. The short, excretory duct leading to the cyst was perfectly normal. The cyst *a* was a small one, and appeared to the naked eye a pin-head-sized, deep-seated vesicle. The cyst contents have disappeared, but were no doubt a clear liquid of acid reaction, as such was the character of all examined in reference to this point. A slight albuminous substance clung to the wall of the cyst. The excretory duct is seen very distinctly entering the cyst at the lowest right-hand corner. The entire wall of the cyst is lined with epithelium.

In the larger cyst no sweat gland is visible in this section, although its special gland was seen in other sections. At the upper part, however, at *b*, is seen the place where the excretory duct communicates with the cyst. This cyst extends farther upward and farther downward in the cutis than the smaller one, but it may have commenced at about the same level. The contents of this one have also disappeared. The walls are lined throughout with epithelium, as in the smaller lesion. In Fig. 87 is shown, under a somewhat lower power, another vesicle which has encroached still nearer the epidermis at the same time that it extends downward into the subcutaneous tissue.

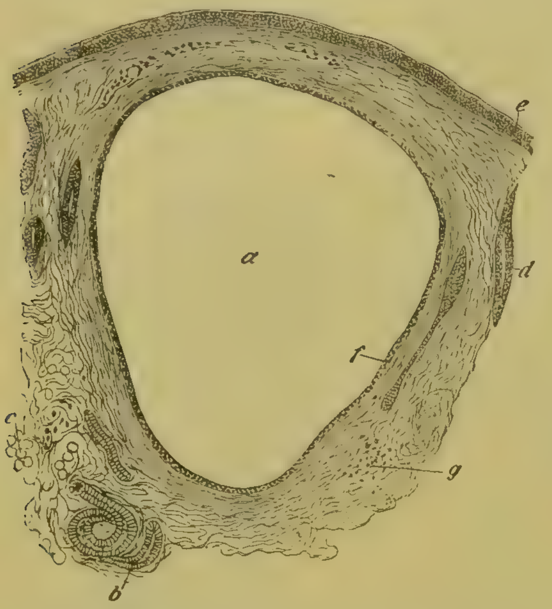


FIG. 87.—Section of vesicle from forehead: *a*, vesicle; *b*, coil of sweat gland; *c*, fat tissue; *d*, hair follicle cut obliquely; *e*, epidermis; *f*, epithelial cells lining cyst wall; *g*, round-cell collection.

This vesicle was larger than the larger one of Fig. 85, but it also showed disappearance of the contents, and the presence of epithelial cells, which completely lined the cyst wall.

A consideration of the conditions present in Figs. 85, 86, and 87 shows that the vesicles arise from dilatation of the excretory duct of the sweat glands at some part of its course within the corium, and that in these lesions the place of formation was in the lower part of the corium. That, however, it is not a passive dilatation, as in an ordinary retention cyst is shown by the marked peculiarity that, whether the cyst be large or small, there is such a rapid proliferation of the epithelium lining the part of the duct affected that the entire cyst wall is lined by this epithelium.

The contents of the vesicles are always, in the earlier periods at least, liquid and clear and slightly acid, characters similar to those present in sweat drops upon a clean cutaneous surface. This liquid is collected within an excretory duct deep in the corium and far removed from the blood-vessels of the papillæ. The connection of the cysts with the sweat coil is proved by the sections, hence we have here a positive proof that a liquid corresponding in character with sweat as it appears upon the free surface is formed by the sweat glands or excretory duct or by both. The theory, therefore, that the sweat glands are fat producing glands only and not sweat-producing, can not be correct when we find such a condition during a state of hyperidrosis. For a full description of the anatomy see my original paper.

Diagnosis.—The eruption bears some resemblance to sudamina crystallina, pompholyx (dysidrosis), eczema, and adenoma of the sweat glands.

Sudamina lesions are caused by retention of sweat within the corneous layer. They are very superficially seated, forming a dewdrop-like eruption, and are very rarely seen upon the face. The contents of the lesions are similar in both diseases.

From eczema the eruption is diagnosed by the acid reaction of the contents and by the absence of inflammation and subsequent crusting. The nature of the contents and the clinical history make the diagnosis from adenoma of the sweat glands easy, but in a photographic representation there is much resemblance.

The location, isolated arrangement of the lesions, and persistent transparency of contents are sufficient for the diagnosis from pompholyx.

Prognosis.—The eruption is of significance only from a cosmetic standpoint. The eruption usually disappears spontaneously in winter, and is almost certain to return in hot weather, or if the patients wash clothes over tubs containing hot water.

Treatment.—Avoidance of such occupations as are known to cause the eruption, and a cool atmosphere when possible. Soft soap and water for washing, so as to thin the corneous layer, may aid in removal of individual lesions; or puncturing them with a needle to allow escape of the contents. I have not tried astringent powders, as bismuth, etc., although they would probably be beneficial.

B. DISEASES OF THE SEBACEOUS GLANDS.

SEBORRHŒA. (George T. Elliot.)

Synonyms: Stearrhœa; Fluxus Sebaceus; Pityriasis; Acné Sebacée; Acne Sebacea; etc.

The proper presentation of the question of seborrhœa is not an easy task to-day, owing to the many grave doubts cast by modern investigation and study upon the right of certain clinical manifestations to be included, as they have heretofore been, in the category of disturbances in secretion of the sebaceous glands. The controversial points do not relate to clinical symptomatology, but to the important question of what should and what should not be regarded as seborrhœa, whether many morbid phenomena held to be due to functional disturbances of the sebaceous glands are not in reality entirely distinct processes, in which the presence of the fatty secretion is either accidental, or due to the site of the lesions, or coexists as a complication. Further questions, which are also entirely undetermined, are the source of the fatty secretion, whether it is from the sebaceous glands alone, or from the sudoriparous glands, or from both; and the origin of the scales, squamæ, and crusts occurring in the various forms of seborrhœa, whether they are epidermic or imperfectly degenerated cells from the sebaceous glands, is by no means settled to the satisfaction of all. The writer recognizes that the subject of seborrhœa demands complete revision and critical investigation, but yet he does not propose here to express only those opinions which seem to himself to be correct. On the contrary, the description customarily given of seborrhœa will be adhered to; but nevertheless, he claims the right to express his own opinions concerning various of the cutaneous changes attributed to seborrhœa, entertaining at the same time due regard for accepted doctrine and the views of all others, however much they may be at variance with his own.

Definition.—According to authors, seborrhœa is a functional disturbance in the secretion of the sebaceous glands, which may be increased in quantity, or diminished in quantity and altered in quality. The scales or crusts seen in certain phases of the process are attributed to these same glands, their origin being ascribed to incomplete metamorphosis of the cells contained in them. In later editions of some works, a slight participation is, however, conceded to the epidermis. In the writer's opinion, Brocq makes a step in advance in defining seborrhœa as "certain affections characterized by disturbances in the secretion of the cutaneous glands, the products of which, mixed with epidermic cells, either concrete upon the surface of the skin, or cover it with an oily coating." He thus allows the inference to be drawn that the sudoriparous as well as the sebaceous glands participate in the process, and he also particularizes epidermic cells as furnishing the scales or squamæ. On the whole, his definition agrees very nearly with the writer's conception of the disease, but he would define seborrhœa simply as a "functional disturbance in secretion of the fat-producing glands of the skin, characterized by an excessive production of fat." For him, the seborrhœa oleosa of the Vienna school, the *acné sebacée fluente* of the French, etc., is the only representative of true seborrhœa, and *he would exclude from that category all those various manifestations of cutaneous disturbance comprised under the name of seborrhœa sicca,* for reasons which will be referred to later.

The subject of seborrhœa is divided by authors into two categories, seborrhœa oleosa and seborrhœa sicca. The former corresponds to the *acné sebacée fluente* of the French, the *stearrhœa simplex* of E. Wilson, the *hyperidrosis oleosa* of Brocq and Unna, and will receive prior description.

SEBORRHŒA OLEOSA.

Symptomatology.—*Seborrhœa oleosa* may occur on surfaces which are covered with hair and on those which are smooth. It is infrequently localized upon the scalp alone, but usually exists in conjunction with the same disturbance on the face. The vertex is the portion most often affected, but the disease may also extend over the parietal regions and even over the entire scalp. The skin is perhaps unchanged in color, or it is somewhat reddened and congested diffusely, or only in patches here and there. The follicular orifices are sometimes dilated and patent, and from them tiny oil-drops may be seen exuding. The hair glistens, is oily and greasy, stringy, and occasionally matted together. The reproduction of the oily matter takes place very rapidly, and even a few hours after thorough washing the greasy condition of the hair has returned. A fatty odor is often noticed, and from want of cleanliness and washing, it may become rancid and offensive. Subjectively, only slight itching is complained of, but more often there is a sensation of heat and of prickling.

Accompanying seborrhœa oleosa of the scalp, there is frequently alopecia. It may be slight or severe in grade, but it is always very intractable.

The same degree of seborrhœa oleosa will not be found in all cases, but in some, the only evidence of its existence will be a decided greasiness of the hair and scalp, a condition persisting unchanged during the entire course of the process; or, in others, the objective symptoms will be of great severity and occasion much annoyance. The other surfaces of the body, which are covered with hair, may also be attacked. In the beard, symptoms similar to those already described may be observed, and here also the process may be productive of alopecia. The same affection has been noted by myself on the pubes, accompanied by marked falling of the hair and, in some cases, by the development of areas even completely bald.

When seborrhœa oleosa occurs on the face, it may be as an independent process or in conjunction with the same symptoms on the hairy scalp. It favors in its location more particularly the middle portion of the face, especially the interpalpebral space, the root of the nose, the nose itself and the adjacent portions of the cheeks and the chin, but yet it may be general. The skin is greasy and oily, yellowish in color and dirty-looking, owing to the ready adherence of dust, etc., to the surface. There is at times a congested appearance, but more often no redness, except about the alæ nasi. The follicular orifices are dilated, the surface acquiring often a sievelike appearance, or the glandular orifices are blocked up by small plugs, which are yellowish in color, or discolored by dust particles, and which can be removed with ease. The oily matter can be seen exuding from the follicular orifices, sometimes in tiny drops, or more diffusely, and spreading over the surface, gives it a glistening, oily look. The pouring out of the secretion may even in some cases be increased by squeezing the skin between the fingers, and it can be seen that it exudes even around the orificial plug, or, when this has been removed, it wells up, as though a mechanical barrier to its outlet had been removed. Subjectively, a burning and prickling sensation is most usually spoken of, sometimes itching and occasionally, a slight sensation of pain. The process also occurs frequently over the sternum and upper portion of the thorax and in the interscapular space—portions of the body rich in fat-producing glands. The same symptoms as have already been described will be met with on these surfaces. Universal seborrhœa oleosa has also been mentioned as occurring, but such instances are certainly exceptional, if not open to question.

There are no special symptoms to be observed during the existence of a seborrhœa oleosa. In its course, it is essentially chronic and may show from time to time exacerbations in degree, or the reverse. Exposure to heat, the summer season, eating and drinking, especially of warm or hot food and liquids, often aggravate it, and also at the time of menstruation, a marked increase in the symptoms may take place and after cessation of the flow be followed by subsidence. Variations in degree will also be seen to occur in accordance with the systemic condition of the patient.

During the course of a seborrhœa oleosa any cutaneous process may develop upon the affected surface, but most commonly an acne exists in association with it. The acne is, however, not the consequence or result of the disturbance in secretion, but arises independently of it. Eczema may also occur as a complication, and particularly that form of disease to which Unna has given the name of seborrhœic eczema. The seborrhœa oleosa does not, however, produce these affections any more than it does an acne, but only acts as a predisposing agent.

Pathology.—Pathologically speaking, seborrhœa oleosa is briefly an exaggeration in secretion of the fat-producing glands. It is, however, a mooted question to-day as to what are these glands and what is the source of the fatty matter seen on the surface—that is, are they the sebaceous glands alone, or do the sudoriparous glands also participate in the secretion? The sebaceous glands are the only source of the fat, according to the teachings of the Vienna school, of Besnier and the majority of the French writers, of Radcliffe Crocker, McCall Anderson, Duhring, Bulkley, and others; but recently, Unna has declared himself in favor of regarding the sudoriparous glands as participants also, and he has to some extent been followed by Brocq and others. It is possible that both the cutaneous glands act as generators of the fatty secretion. Still, the sebaceous glands unquestionably are especially interested in seborrhœa, for it always occurs on those portions of the body especially rich in these glands. There is practically nothing to be said in regard to the morbid anatomy of seborrhœa oleosa. It needs to be subjected to critical and careful investigation and study. The writer would only state that, from personal investigation, he has found that the small plugs filling up the glandular orifices are not fat, as is generally believed and claimed, but that they are composed of epidermic cells, derived from the epidermic lining of the follicular opening, impregnated with the fatty hypersecretion.

Etiology.—The causes of seborrhœa oleosa are not very accurately known. It develops at almost any age, but perhaps more frequently at puberty and in young people. Persons of dark complexion are more liable to it than blondes, and women are more often subject to it than men. Climatic conditions and race also seem to favor its development. Many cases arise in an idiopathic manner and in persons apparently in perfect health; but it is seen more frequently in tubercular subjects, in those who are anæmic, chlorotic, or who have gastric or intestinal disturbances, fermentative dyspepsia, constipation, etc., or who suffer from menstrual irregularities. It may occur in women after the climacteric, or it may develop during convalescence after severe illness, and also in the course of various general diseases, as syphilis, malarial poisoning, etc. Rosacea apparently induces it, probably owing to the congestive disturbances which that disease occasions, and the writer has seen several times a seborrhœa oleosa originate upon a surface, which had been the seat of an erysipelas. In a number of cases also, the development of the seborrhœic affection was apparently due to exposure to a fire, or to heat from working habitually with a lamp or a gaslight in close proximity to the head and face. Besnier and Doyon state that local nervous traumatisms and moral influences may have a manifest effect upon the functioning of the sebaceous glands, and also that intranasal processes may occasion a seborrhœa oleosa of the nose.

Diagnosis.—The diagnosis of a seborrhœa oleosa should offer no difficulty whatever, as its characteristic symptom, the fatty hypersecretion, is readily recognized. It would scarcely be possible to confound it with any other process when it alone is present, or even when it complicates some other cutaneous disease.

Prognosis and Duration.—No particular limit can be established in regard to the duration of a seborrhœa oleosa. It may remain in existence for months and years and disappear spontaneously, or its existence may be influenced by the therapeutic measures employed. Its prognosis is always favorable. Its continuance affects in no way the general systemic health, and its results, when on hairy surfaces, are only alopecia. It may, however, be said to predispose in some degree to the development of other cutaneous processes.

Treatment.—The treatment of seborrhœa oleosa is both constitutional and local.

Constitutional treatment consists especially in the regulation of every functional or other disturbance which may be present in any individual case. Constipation, gastro-intestinal derangement, menstrual irregularities, etc., should be corrected by appropriate treatment; anæmia, plethora, or nutritive defects of every nature should receive due attention, but the remedies employed do not differ from those which are prescribed when the same systemic conditions are present and unassociated with the cutaneous process; or, in other words, there are no specifics for seborrhœa oleosa, any more than for any other skin disease. Exercise in the open air, a change from a sedentary to a more active life, and attention to the ordinary laws of personal hygiene, should also be directed. The diet should be plain and nourishing; rich, greasy articles of food forbidden; pastries and sweets avoided; and the use of alcoholic and fermented beverages, liqueurs, etc., be reduced to a minimum, if not entirely stopped. In seborrhœa oleosa of the nose, the writer has frequently found that smoking was injurious, its cessation being followed by excellent results, and Besnier and Doyon advise that when this locality is affected, intranasal affections should always be sought for and removed. The same authors recommend mineral waters—Kreuznach, Spa, Bourboule, Uriage, etc. Brocq advises the internal administration of belladonna, atropia, hamamelis, ergotin, in some cases when the scalp is affected. The writer would particularly recommend ichthyol internally. It is best given in capsule, though it may also be taken diluted in water, or in some other liquid. The formula usually used by him is:

℞ Ichthyol ammonio-sulph. . . . . gr. v
Confec. rosarum,
Pulv. lycopodii, āā q. s. ut ft. capsule no. j. M.

Beginning with one capsule *ter in die*, the number is gradually increased to five or more daily, according to the patient's ability to take them. If the remedy is given in water, the initial dose may be five drops and increased to ten or fifteen. Occasionally, complaint will be made that the ichthyol causes flushing of the face, a sensation of heat, dull headaches, etc. Its use should then not be persisted in, but such instances are as a rule uncommon. In the vast majority, its effects are beneficial not only on the skin, but also on the system generally.

The local treatment constitutes a most important portion of the therapeutic measures employed for seborrhœa oleosa. The use of soap and water is especially indicated. The writer would advise strongly against hot water, as in his experience it only increases the hypersecretion, and cool or tepid water is much to be preferred. Any good soap may be used. Medicated soaps have not been found by him to exert any action which would lead to their recommendation, but Brocq advises a naphthol-sulphur or a tannic-acid soap. The tinct. saponis viridis (Am. Ph.), or, better, the weaker spts. saponis kalinus of the Germ. Ph., are both very serviceable. Especially is this the case when the nose and face are the portions affected; but care must be taken that too great irritation be not produced by them. For the scalp, Besnier and Doyon recommend a decoction of radix saponaria or one of quillaya. The use of the soap and water should be a daily one, and after drying the surface, it should be followed by one or other of the applications chosen. These may be alcoholic lotions containing sulphur, or naphthol, or salicylic acid, or solutions of borate of soda, mercuric chloride, etc. If the surface becomes dry and irritated from any of these, then sulphur, or naphthol, or tannic acid pomades may be substituted for the lotions, or used alternately with these latter. Brocq favors powders and recommends that in severe cases the affected surface be thickly powdered at night with ℞ acid salicyl, or sodii salicylat., 3 to 10 parts; amyli., 10 parts; talc. pulv., 100 parts. M. To this there may be added, if desired, acid tartaricum, 3 to 6 parts; zinc oxide, bismuth subnitrat., āā 20 parts. In the morning, the scalp is washed with soap and water and the powder is reapplied, or, instead of it, an alcoholic solution of quinia or of tannic acid. Various writers recommend solutions containing soda, ammonia, sulphate of iron, gallic acid, etc., as well as alkaline and sulphur baths. Oil of cade and the other tars have also been used, but will be of little service in pure examples of seborrhœa oleosa. For severe and intractable cases, Vidal has suggested scarifications, and good results are claimed to be obtained by this method. The writer would particularly recommend resorcin, preferably in alcoholic solutions, in the strength of three to twenty per cent. It may also be used on the face in Bassorin paste, or on any surface in ointment form. Resorcin has appeared to me to be superior to all other remedies, and it has been exceptional to require any other in the local treatment of the process. Astringent lotions are sometimes useful, such as one containing sulphate of zinc (gr. 5 to 25 ad ℥ j) and sulphur præcipitat. (gr. 25 to 75 ad ℥ j); or, ℞ magnesiæ carbonat, zinc oxide, āā ʒ j; aq. calcis, aq. rosæ, āā ℥ ij. M. A saturated solution of boric acid in alcohol; aristol, dissolved in ether and alcohol or in ointment form, may also be recommended. The duration of the treatment is, however, never short, but it has to be kept up and persisted in for a long period of time.

SEBORRHŒA SICCA.

Many varying clinical pictures of cutaneous disease are included under the designation *seborrhœa sicca*, and attributed to an alteration in the quality and, by some writers, in the quantity of the sebum secreted by the sebaceous glands. It is, therefore, necessary to give the symptomatology of each of the forms of the process, it being impossible to describe them succinctly and as a whole.

The simplest form is that one usually known as pityriasis capitis, faciei, barbæ, etc., according to the part of the body on which it occurs. It is synonymous with the pityriasis simplex of the older writers, with seborrhœa furfuracea seu pityriasiformis, erythema capitis (McCall Anderson), acné sébacée sèche (Besnier), eczema seborrhoicum squamosum (Unna and the writer). It was first made a part of seborrhœa sicca by F. Hebra, though previously considered to be an independent disease, and has ever since remained in that class, notwithstanding that many observers have claimed that it was in nowise a seborrhœa, or due to an alteration in the quality of the sebaceous secretion.

Symptomatology.—*Pityriasis simplex* occurs most frequently upon the scalp, but it is also found on the face, in the beard, and on other portions of the body. When on the scalp, it represents that form of disease popularly termed *dandruff.*

It manifests itself by a more or less abundant accumulation of thin branny or powdery scales, white or grayish in color, situated especially over the vertex, but also extending over other parts or over the entire scalp. The squamæ are loose, except the lowest layers, which are quite adherent; they fall off easily and are commonly seen on the coat-collar of the patient. Under the scales, the scalp is usually white and lusterless, though diffuse or patchy redness will frequently be seen. The hair is dry and without luster, it breaks easily and when long is split at the ends. The accumulation of squamæ may, however, be excessive, occurring either diffusely or in patches over the vertex and more or less in combination with the previous grade. The scales are then very adherent, form thick masses, and are often prolonged upon the hairs in the form of sheaths, binding and matting them together. When removed, the masses break up easily into white, asbestos-like scales, which are dry and brittle, sometimes a little greasy from the admixture of fat. With this form of seborrhœa sicca, a zone of redness is often seen extending a variable distance beyond the patch, and when the masses are removed, a red and perhaps moist surface will frequently be exposed.

The writer has often observed the disease on the scalp presenting slightly different clinical features. In these cases, the squamæ are not very abundant, but form a thin coating, which is quite adherent and can only be scraped off with the nail. The follicular openings are choked up with the accumulation of scales, and sometimes the squamous coating has a more or less granular aspect, is slightly discolored, yellowish, dirty-looking, the scalp and hair being very dry.

In all these forms there is subjectively a certain amount of discomfort, of itching and burning, especially if the individual becomes heated or perspiring from exercise or exposure to heat. Sometimes tingling or stinging is complained of, and occasionally formication. Alopecia is a consequence of this form of disease, and, in the writer's experience, an almost invariable consequence.

Seborrhœa sicca seu pityriasis being present on the scalp, its extension to the forehead along the margin of the hair and on the ears (*seborrhœa pityriasiformis squamosa* of margin of hair and of ears—Besnier) is frequently seen. Besnier states that it occurs especially in women, an observation which the writer can corroborate. The affected surface is slightly reddened, or at any rate, manifests irritability by becoming red under slight provocation. There is not much desquamation, but the scales are fine, quite adherent; the skin has a slightly seared appearance. On the cheeks, these symptoms may be more accentuated and, in addition, there may be patchy redness, the patches covered with thin, fine scales, not abundant, though the skin as a whole appears and feels rough to the touch and presents an uneven and mottled aspect. Or there may be round or oval, quite sharply defined plaques of varying size, which are of a very pale red and covered with fine scales. They itch slightly, and are mentioned as occurring frequently in women and children in the spring and fall (Brocq).

The seborrhœa sicca pityriasiformis may also extend over the entire face, or it may occur in the eyebrows and on bearded surfaces only. When the former are the seat of the affection, there may be the same appearances as have already been noted on the scalp. In the writer's experience, the condition of pityriasis usually extended beyond the limits of the eyebrows, upward on the forehead and to the interpalpebral space. The bearded surfaces will also present similar symptoms as the scalp, but the itching here is severer, the formation of reddened inflamed areas is more frequent, and the hair is often dry and wiry and more or less unmanageable.

The pityriasiform seborrhœa sicca may also occur on the pubes, over the sternum and other portions of the body, the symptoms, however, differing in no way from those already given as occurring on nonhairy surfaces. Pityriasis tabescentium will be considered under universal seborrhœa sicca.

Instead of these symptoms, there occurs on both hairy and nonhairy surfaces those crusting forms of seborrhœa sicca termed acné sebacée concrète, croûtes graisseuses (Brocq), stearrhœa flavescens, nigricans, cærulea (E. Wilson), seborrhœa cerea (Crocker), crusta lactea, etc.

According to Kaposi, the *crusta lactea*, or the milk crust of infants, is an especial representative of this form of seborrhœa. It occurs over the vertex particularly, but also develops on other portions of the scalp, and is characterized by the formation of more or less thick masses of scales and crusts, which are distributed in patches, or which form a uniform coating. These masses are dry, resistant and adherent, or soft, depending upon the quantity of fat mixed with them, and they are therefore either friable or greasy and fatty. In color they are grayish, or yellowish, or brown, and they rest upon a red, inflamed, smooth, moist skin, which, owing to the thinness of its horny layer, fissures easily. Here and there, denuded weeping areas may be seen, which have a most marked eczematous appearance, and which bleed very easily when scratched or rubbed. The hair comes out freely and in abundance.

Children and adults suffer frequently from that form of seborrhœa sicca of the scalp, which over the vertex and also over the temporal regions is constituted by an accumulation in a uniform manner of soft, yellow, dirty-looking, brown, or even blackish fatty crusts. They are sometimes slightly adherent, more often they can be easily removed, and the scalp underneath is reddened and congested, either diffusely or only in areas, very oily and greasy, the follicular orifices often dilated and patent. When the masses are removed, they reform with great rapidity. More or less burning and tingling are complained of, and sometimes the itching is severe. Alopecia frequently occurs and is usually very rebellious.

Similar phases of seborrhœa sicca have occasionally their seat in the beard and on the upper lip. In these situations, the symptoms are much more those of an eczema, and that diagnosis would most likely be made. The writer has observed similar conditions on the mons veneris.

On smooth or nonhairy surfaces, the crusting form of seborrhœa occurs especially on the nose at its root and in the nasolabial furrow. Large areas may, however, be also met with on the cheeks, or it may be in the form of circumscribed discrete patches, or again, it may cover the entire face. The forehead, the ears, or the chin may also be affected by the process. The cutaneous surfaces covered by the crusts are red, swollen, somewhat sensitive, painful fissuring occurring sometimes at the nasolabial furrows. The crusts are yellow, brown, or blackish, soft and greasy, and when removed with care, prolongations into the dilated follicular orifices over which they are situated may be noted. Seborrhœa sicca in its several forms may occur on the eyelids. The pityriasic form is not very frequent, but more usually the scales along the margin represent small crusts, which are adherent and are continued upon the eyelashes as sheathlike prolongations. The margins of the lids are reddened, slightly tumefied at times, the conjunctiva a little injected, the eyes feel weak and irritated. Loss of the eyelashes is frequent, and in some cases of long standing the writer has found them to have been completely destroyed, an atrophic condition of the margins of the lids having resulted.

Besnier speaks of a form of seborrhœa of the eyebrows and eyelashes in which the hairs are agglutinated together by fatty crusts and fall out most readily. He mentions neuropathic girls as especially subject to it.

Besnier also refers to a seborrhœa pilaris of the lower limbs resembling very closely ichthyosis pilaris and the xeroderma pilaris of lymphatic subjects. The writer confesses his inability to recognize this form of the process.

Seborrhœa sicca occurs also in the umbilicus. According to Kaposi, the accumulation of fat and epidermic scales and *débris* becoming rancid may produce marked inflammation. The writer has seen a number of these cases, but always found that the inflammation had been primary, and that rancidity of the fatty secretion and decomposition of the products of the inflammation only increased the grade of the inflammation already existing. As seborrhœa sicca of the vermilion border of the lips, Besnier refers to a form of disease which is occasionally seen, and which is included under that designation, notwithstanding that there are no sebaceous glands on these surfaces. Both lips may be affected, but more often it is the lower lip. The writer has had some fourteen cases of this form of disease, and has found it to be invariably connected or associated with a pre-existing pityriasis, or some other grade of the symptoms attributed to seborrhœa sicca on the scalp, and also with similar conditions on the nose or other portion of the face. The vermilion border affected is exfoliating or crusted, irritable, painful, usually swollen, stiff and awkward. The squamæ are large, adherent, have a dry, horny appearance, or they are heaped up into yellowish or brownish crusts, sometimes dark in color from an admixture of blood. When removed, the surface has a glistening aspect; it is usually somewhat moist, in places denuded and bleeding easily. The crusts reform with great rapidity and not infrequently the disease extends beyond the limits of the vermilion border to the contiguous cutaneous surface. More often, however, it is sharply limited to the vermilion border itself.

Seborrhœa sicca of the genitals occurs in the male, especially in the balano-preputial furrow, and the accumulated whitish secretion has a peculiar offensive odor—smegma præputii. It leads frequently to erosions of the prepuce and glans, to balanitis, accompanied by a thick mucoid discharge, which may become purulent. In the writer's experience, it would seem frequently to lead to attacks of herpes on the prepuce and glans. In the female, the clitoris and the vulva become affected, presenting much the same symptoms as have been described. There may also be, however, a marked, very offensive, purulent discharge, accompanied by severe burning sensations.

In this group of localized seborrhœa, authors have also included the *verruca senilis*, first described by Neumann as a local hypertrophy associated with the general atrophy of the skin of the aged. It corresponds to the *acné sebacée concrète* of the French, and more recently Unna has termed it *verruca seborrhoica*, owing to its frequent association with a seborrhœa. Though described as a development of old age, Brocq mentions having seen well-defined instances in young people. According to authors, it occurs most frequently upon the trunk, the neck, and the arms. The writer has met them often upon the backs of the hands, and perhaps with greatest frequency upon the face, especially upon the forehead and temporal regions, but also on the nose. The lesions vary much in size, are irregular in shape, as a rule flat or uneven, and having a more or less granular aspect. They are yellowish or brownish and often black in color. The crust is firmly adherent, requires a little force to remove it, and the base upon which it rests is often granular, has a slight warty appearance, and usually bleeds a little. They are more often discrete, but may occur in groups or be arranged linearly, and also form occasionally quite large diffuse patches. Sometimes they are itchy and frequently on the face, they are associated with a seborrhœa oleosa. Their importance is entirely due to the fact that they may undergo malignant degeneration and constitute the starting point of an epithelioma. Seborrhœa congestiva of Hebra has long been recognized as being lupus erythematosus.

The seborrhœa corporis of Duhring is synonymous with lichen circumscriptus (Willan), L. gyratus (Biett), lichen annulatus et serpiginosus (E. Wilson), eczema acnéique (Lailler), flannel rash of the English, seborrhœa papulosa seu lichenoides (Crocker), a form of eczema seborrhoicum (Unna, Elliot), etc. In its location, it favors especially the sternum and the interscapular space, but it may also appear upon all other portions of the body, except upon the face. Brocq mentions its occurrence upon the scalp. All authors speak of its existence on the body being associated with those symptoms upon the scalp called seborrhœa; it may be a pityriasis or some other grade. Besnier mentions a hyperidrosis oleosa as a frequent accompaniment. The writer has always found in these cases that the implication of the scalp not only existed in association with the process on the trunk, but had invariably preceded the development of the latter for some length of time. It begins under the form of very small red papules capped with a minute scale, which coalesce to form small ring-shaped lesions. These undergo peripheral extension quite rapidly and enlarge, the central portion clearing up and becoming pale red, or yellowish, or even brownish in color, and covered with a variable amount of desquamation. The scales are sometimes dry, but more often fatty, and come off easily, though at times quite adherent. The peripheral portions are usually slightly elevated and composed of small papular elevations, which are for the most part excoriated, but they may also be uniform and are always sharply defined and delimited toward the healthy skin. Involution of a portion of a ring-shaped lesion may occur during peripheral growth and a crescentic efflorescence results, or one representing some segment of a circle, or several rings coalescing together, a patch having a more or less polycyclic contour is formed. The central portions of the lesions and patches are never elevated or infiltrated. At times, considerable itching occurs, but in the majority of cases the subjective symptoms are only slightly marked.

According to authors, seborrhœa sicca as a universal disease is not of frequent occurrence. Kaposi describes under the name of *ichthyosis sebacea* or *seborrhœa squamosa of the newborn*, a form of the process which he considers as a sequel and a continuation of the excessive production of the vernix caseosa of intrauterine life. The cutaneous surface as a whole or in part is brownish-red, as though varnished. It is tense, disposed to painful fissuring, especially about the mouth and cheeks and flexures, causing inability to take nourishment and leading to inanition and death. Kaposi claims that this form of disease is a true seborrhœa, and distinct from ichthyosis congenitalis or fœtalis, regarding the cases described by other observers (Sievruk, Kyber, Hebra, Jr., Lebert, and others) as belonging in the same category.

The generalized seborrhœa sicca seen in adults is represented, according to Hebra and Kaposi, by that scaly condition of the integument seen in marasmic subjects, to which the name of *pityriasis tabescentium* is given. Its symptoms consist in a constant desquamation of lamellæ, especially from the extensor surfaces of the extremities and the trunk.

Kaposi also describes a rare form, which he attributes to seborrhœa, under the name of *cutis testacea* or *ichthyosis sebacea.* It occurs also especially on the trunk and the extensor surfaces of the extremities, which are covered with a greenish-brown and black incrustation, broken up into small fragments fitting into one another. The incrustation may be slight in degree or piled up and prominent. They are easily removed, and the skin underneath is normal or slightly red, the sebaceous orifices dilated and filled with prolongations from the under surface of the crusts.

Pathology and Morbid Anatomy.—It is extremely difficult to give any description of a pathology of the clinical forms of disease included under the designation of seborrhœa sicca. The institution of the process was made by Hebra, who ascribed it to imperfect fatty metamorphosis of the cells of the sebaceous glands, basing his opinion upon the result of investigations made by Pohl-Pincus, who found that a large percentage of the products of the disease upon the skin was composed of fat. Since Hebra, the pathological opinion enunciated by him has continued in force, although from time to time various investigators have claimed and demonstrated that certain of the clinical phases of disease included in seborrhœa sicca were not connected with any disturbance in secretion in the sebaceous glands. The writer would mention as examples the pityriasis capitis, faciei, barbæ, etc., the verruca senilis, ichthyosis sebacea, and, in fact, it may be stated that the entire constitution of the disease has been strongly questioned. Malassez, Chincholle, Auspitz, Piffard, and McCall Anderson regard the pityriasis form as an epidermic disease unconnected with the sebaceous glands, and the last-named author considers it as pathologically a superficial inflammation. Unna as well as the writer have expressed themselves as believers in its parasitic origin, in its being inflammatory in character, and a stage of that form of parasitic dermatitis to which Unna gave the name of eczema seborrhoicum. As far as its being due to an inflammation of the skin, the authors specified agree in every particular with the dermatological writers prior to Hebra, and E. Vidal has always and still entertains this same opinion.

The crusting seborrhœa sicca, croûtes graisseuses (Brocq), on the scalp or nonhairy surfaces, are regarded pathologically in various ways by authors. Some ascribe it to an excess in quantity and an alteration in the quality of the secretion of the sebaceous glands. Others regard the crusts as composed of epidermic scales mixed with fat, and among these the writer would include himself. In his opinion these forms of cutaneous disease are inflammatory primarily, but complicated by a seborrhœa oleosa, and the crusts are composed of epidermic squamæ, which are soft and greasy, owing to the admixture of fat from the fat-producing glands. He would agree with Unna that these phases of disease are forms of that process described by him under the name of eczema seborrhoicum, their origin being a parasitic one. Unna asserts that the coiled glands are the producers of the fat; but the writer, notwithstanding his entire readiness to accept that view, if fully proven, has not been able to substantiate the claim by personal investigation.

The seborrhœa corporis of Duhring has also been shown by Unna, as well as by the writer, to be primarily an inflammatory affection, and not a disturbance in secretion. Besnier and Doyon, Vidal and others consider it to be a form of parasitic eczema, and the general opinion to-day is that it is an affection due to micro-organisms.

The inclusion among the forms of localized seborrhœa sicca of that one occurring on the vermilion borders of the lips may certainly be questioned. There are no sebaceous glands in these localities, but mucous glands, and it is consequently difficult to understand why these cases should be considered pathologically as representing a form of *seborrhœa.*

That seborrhœa of the genitals is a seborrhœa is likewise doubtful. The smegma is composed of epidermic cells mixed with the secretion of Tyson's glands. It can not be regarded as a pathological secretion, but rather as a normal one, its accumulation and decomposition occurring only when cleanliness is not observed. The results, besides, are, under such circumstances, inflammation from irritation. The possibility of micro-organisms playing an important part in the production of these secondary symptoms should not be left unconsidered. Verruca senilis was first described by Neumann as a manifestation of senile change in the skin. Barthelemy excluded it from seborrhœa. Schuchardt's investigations led him to regard it as strictly analogous to the process termed *psoriasis linguæ*, and the writer's study of the affection would allow him to make the same conclusion. Unna regards the lesion as a seborrhoic wart, owing to its frequent association with seborrhœa oleosa. Pollitzer believes it to be a near relative of Recklinghausen's group of lymphangiofibroma.

Of the universal seborrhœas, the pathological conception of Hebra and Kaposi in regard to *pityriasis tabescentium* is rejected by many, who hold that it is only a condition of cacotrophia of the skin, brought about by the marasmic state and in no way connected with the sebaceous glands. It is certainly difficult, in the writer's opinion, to consider this process as a seborrhœa. His examination of the marasmic skin has never shown any changes whatever which could be connected with the sebaceous glands. If it belongs at all among glandular diseases it would more properly be in the category of asteatosis.

Kaposi claims that his seborrhœa squamosa of the newborn is a true seborrhœa, but Lebert, Hans Hebra, and especially Kyber, have shown that it was a neoplasia of the horny epidermis, which led to a *destruction of the sebaceous glands*, through hornification and pressure atrophy. Kyber was able to demonstrate that the process began in the fourth month of fœtal life, and observers have reported the occurrence of similar changes in calves as well as in human beings. The entire want of any uniform pathological basis for the conception of a disease, seborrhœa sicca, can thus be seen, and it is for this reason and on account of his personal investigations, as well as those of others, that the writer has been led to state that he would reject entirely the cutaneous process seborrhœa sicca as customarily conceived and pathologically delineated.

Etiology.—Practically, seborrhœa sicca is attributed by authors to the same etiological causes as have been mentioned for seborrhœa oleosa. Digestive disturbances, constipation, improper nutrition, general bad hygiene, excesses of all kinds, are accused of being active causes leading in a predisposed subject to the development of the process. Some general systemic disease—anæmia, pregnancy, syphilis, etc.—would also act causatively. Kaposi attributes the milk crust to a continuation in the formation of the vernix caseosa of intrauterine life, and the ichthyosis sebacea to the same cause, but what factors favor this persistence in excessive production is not stated. Kyber and others, who regard this affection of the newborn as not a seborrhœa, attribute its existence to some abnormality in fœtal development. No particular causes are mentioned for the pityriasic or crusting forms, but the seborrhœa corporis appears to develop very frequently upon those who wear flannel and are not given to cleanliness. In the writer's opinion, too much stress can not be laid upon the probable parasitic origin of many of the cutaneous disturbances classed under seborrhœa sicca. The parasitic agents are certainly not yet definitely and incontrovertibly demonstrated, but there are many clinical facts which allow the probability to be strongly suspected and entertained that micro-organisms are the true causal factors in the production of many of the clinical manifestations called seborrhœa.

Diagnosis.—The diagnosis of the various phases of seborrhœa sicca should offer no difficulty, though at times they resemble an eczema, except that the crusts are often fatty and not formed by inflammatory exudation. The affected surfaces are also usually pale, or yellowish, or yellow red in color and dry, not moist, infiltrated and reddened, as in eczema. There is also an absence in the former of vesicles, or pustules, of marked itching, or of those general symptomatological characteristics pertaining particularly to the latter disease.

Seborrhœa sicca of the scalp may be differentiated from psoriasis in that the latter, as a rule, occurs in discrete patches, covered with thick, abundant dry scales seated upon a red base. It rarely remains localized on the scalp. Tinea tonsurans of the same region is easily recognized by its tendency to form rings, the brittleness of the hairs, which are broken off just above the level of the skin, and by the presence in the hairs and scales of the tinea trichophyton.

In seborrhœa of the genitals, especially when there is a tight prepuce or a phimosis, the possibility of a discharge being due to a venereal lesion, præputial gonorrhœa, or a chancre, should be kept in mind.

Prognosis.—The prognosis in general is favorable. By the use of proper treatment, the symptoms can always be ameliorated and in the majority of cases, they can be cured. When the vermilion border of the lips, or the alæ nasi are affected, great rebelliousness is the rule, and when the scalp is the seat of the process, a guarded prognosis should be given in regard to the accompanying alopecia. Generally, it ceases with the removal of the disease, but not always. Kaposi states that the seborrhœa squamosa neonatorum may be followed by a fatal result. The writer believes that, of all the universal cases reported, only one lived as many as nine days. Some, which were very slight in degree, got entirely well. The prognosis of the verruca senilis is, as a rule, good. It is only a disfigurement, but still it may and often does undergo epitheliomatous degeneration.

Treatment.—The treatment of seborrhœa sicca in general is divided by authors into systemic and local.

The *systemic treatment* is directed toward the rectification of all deviations from health as regards the vegetative functions, as well as any other disturbance of the normal somatic condition. The remedies made use of under these circumstances are the same as are indicated for such disturbances existing independently of the seborrhœa. Iron and cod-liver oil are specially mentioned by Crocker. Arsenic is also recommended for those cases in which scaliness is a prominent symptom. Duhring praises sulphur, especially in the form of the calcium sulphide, gr. $\frac{1}{8}$ *ter in die.* In lithæmic and rheumatic subjects, Brocq advises alkaline treatment, carbonate of lithia, benzoate of soda, etc. General hygienic treatment is also recommended, such as open-air exercise, good healthy food, avoidance of excesses of all kinds, as well as *in baccho et in venere.* If the patient is nervous and of neurotic temperament, valerianate of zinc, or elixir of ammon. valerianat., or any other antispasmodic or nerve sedative may be administered. In the writer's experience, however, little or no benefit has ever been derived by himself from internal treatment alone and without the local means indicated by the nature of the disease.

Local Treatment.—The first indication to be met is the softening and the removal of the scales and crusts. This may be done by means of oil—olive, cod-liver, linseed, cotton-seed, or any other oil—or lard, vaseline, or butter may be used.

On the scalp, the oil should be freely applied and allowed to remain on the surface, being renewed several times daily until the crusts are softened; they may then be removed by a thorough washing with soap and warm water. The soap used may be ordinary toilet soap, or castile soap, or Sarg's liquid glycerin, or any other soap. Medicated soaps are of no especial value. For adults, the spiritus saponis kalinus of Hebra is the best. It can be easily made by dissolving, by means of heat, sapo viridis, 1 part, in spiritus lavandulæ alb., 2 parts, and then filtering. A question frequently asked by women affected with the crusting form of seborrhœa sicca is whether the hair should be cut short. In the writer's opinion, such a procedure is unpardonable and unnecessary, the inconvenience of long hair being obviated by a little trouble. In washing the scalp, hard rubbing and irritation should be avoided as much as possible, and Besnier and Doyon very justly point out that as a result of such washing, many patients have attacks of eczematous dermatitis or a condition of scaling erythema remains. Besides soap, any of the preparations mentioned for seborrhœa oleosa may be made use of.

For the milk crust on infants, greater care and avoidance of irritation are to be observed when softening the crusts and washing the affected surfaces, though the same procedures may be employed.

For the local treatment of the scalp freed from the scales and crusts, Kaposi recommends balsam Peru, 1 part in 50 parts of olive oil, or an ointment of zinc oxide, gr. 7½; oil of laurel leaves, ♏ 75; ungt. emolliens, ʒ vj. M. When the skin has hardened a little and is no longer irritable, the hair should be brushed for several weeks with alcohol alone, or with acid carbolic, 0·15; spts. vini, 100; glycerin, 1·50. M. Instead of the carbolic acid, boric or salicylic acid, 3 per cent, may be used. This should be done every day, or several times during the week. Crocker recommends for obstinate cases on the scalp, an ointment of ℞ ungt. hydrarg. nitrat., ʒj to ʒiv; ol. cadini, ʒj; ol. olivæ, ʒij; lanolin, ʒiv. Apply every night and wash out, if necessary, the next morning with borax, ʒij to water Oj, and then rub in a little almond oil. The ungt. hydrarg. oxid. flav. may be substituted for the nitrate. When there is much hyperæmia, he advises soothing applications.

The writer would particularly recommend resorcin in seborrhœa sicca of the scalp, whether in the scaly or in the crusting form. According to the degree of severity of the symptoms and of the inflammatory reaction, it may be used in either an ointment or a lotion. In the former, the resorcin may vary from one to twenty per cent; in the latter, five to ten per cent strength will be all that is necessary. The base employed may be the ungt. aq. rosæ or simplex, or zinc oxide. In lotion form, the resorcin had best be dissolved in spiritus vini. and aqua, āā partes acquales. Hydrargyrum bichloridum has also proved very useful in equal parts of alcohol and water, in the strength of 1 to 1,000, or less. When there is much itching, chloral hydrate, two to three per cent, will be very useful. Besides these, he would recommend the beta-naphthol of Kaposi, one to five per cent, when the other remedies fail; and in some cases, which present patches of redness, which are somewhat elevated and resist all other forms of treatment, he would recommend chrysarobin, five per cent ungt., or pyrogallic acid, three to five per cent, in alcoholic solution or in ointment form. The most generally useful remedy is certainly resorcin, though sulphur is almost equally so. Still, care must be observed in applying sulphur, for many skins are acutely inflamed by it and eczema often results from its use. This is more particularly the case when the seborrhœa sicca affects the face, or other portions of the body. On these surfaces, the same remedies as have already been mentioned will be found applicable. Especially can resorcin be recommended; but on the non-hairy parts, weaker percentages than for the scalp are to be used. Crocker advises for cases in which there is much hyperæmia an ointment of liq. plumb. subacetat., ♏xxx; vaselin alb., ℥ j.

The especial and prime indication in seborrhœa of the genitals is cleanliness. Daily washing of the genital organs by both male and female —unfortunately the exception rather than the rule—may be said to be a specific preventive. When erosions or excoriated inflamed areas exist, the washings should be kept up—several times daily, if necessary, to remove the exudation—and the parts should be kept as dry as possible. This may be done by means of ordinary powder, lycopodium, etc., but better by ℞ bismuth, 1 part; salol, 1 part; zinc oxide, 2 parts; M. S. Dusting powder. Calomel and zinc oxide, equal parts, is also very useful; or, if there is much exudation, carbonate of magnesia may be added to one or the other powders recommended. Kaposi advises lotions, as carbonate of copper, 0·15; aquæ, 25, or basic acetate of lead, 0·50; aqua, 30, or zinc-oxide ointment. At the same time, the parts should be separated by a thin layer of lint, or, better, of absorbent cotton. Ichthyol in lotions or in ointment form is also of value.

The treatment of the verruca senilis will probably be dealt with in another portion of this work; but the writer would mention here, since the affection is included by authors in seborrhœa, that in his experience a ten-per-cent naphthol plaster, and especially the Paquelin cautery, are particularly to be recommended.

For seborrhœa sicca of the vermilion border of the lips, Besnier recommends scarification.

There are no particular procedures or remedies for the treatment of generalized seborrhœa sicca. The same general steps should be followed in dealing with a case more or less universal in extent as with the localized forms of the disease. If an infant has ichthyosis sebacea (Kaposi), it should be kept constantly covered with some grease, the fissures kept apart by pledgets of absorbent lint covered with ointment. Artificial nourishment should be resorted to, and the baby wrapped in cotton or wool, to counteract as much as possible the loss of animal heat. Kaposi recommends that it be washed every day with soap and hot water and the grease be then reapplied.

ASTEATOSIS. (George T. Elliot.)

Synonyms: Acne Sebacea Exsiccata; Asperitudo Epidermidis; Asteatodes; Xerosis.

Definition.—It is questionable whether asteatosis should be regarded as a cutaneous disease in itself, or as only a symptom acquired under certain conditions, or as secondary to other processes and affections having their own peculiar pathological causes. It is mentioned as being occasionally idiopathic, but yet I know of no recorded idiopathic cases, and it would appear from the writings of authors to be more properly an effect of certain conditions and diseases than a disease itself. Asteatosis is, however, defined as an entire absence or a diminution in the amount of the sebum secreted by the skin.

Symptomatology.—The skin, deprived of its natural and physiological fatty secretion, appears dry, the epidermis friable and desquamating moderately. When on the hands, which are commonly the affected portion, the epidermis is apt to be thickened, to be wanting in elasticity, and in consequence to be here and there fissured, and the fingers more or less flexed. Asteatosis may also occur on any other portion of the body in a limited manner, and it may even be universal. The condition does not belong to any particular age or sex, and, though it is said to be occasionally idiopathic, it is most usually acquired.

Pathology.—Pathologically, there is an absence or a diminution in the natural or physiological secretion of sebaceous or oily matter. In those instances which are acquired, the secretion may be normal, but its incessant removal provokes the pathological symptoms of the process. There is, however, no explanation to be given for those other cases in which the asteatosis develops secondarily to various diseases or arises idiopathically.

Etiology.—The diseases with which the condition may be associated secondarily in a local, or in a more or less general manner, are leprosy, prurigo, scleroderma, psoriasis, pityriasis rubra pilaris, ichthyosis, etc., and it forms an element in senile marasmus and in atrophic conditions of the skin. The acquired form is seen very frequently in laundresses and in those whose occupations require the hands to be much in potash, or lime, or lye solutions. Alcohol may also produce the condition, and also to a slight degree the too frequent use of soap and water and cold baths, etc.

Diagnosis.—The occupation of the patient aids somewhat in making a diagnosis, though error could be made only in the presence of a retrograding eczema, or, on the palms of the hands, of a slight grade of pityriasis rubra pilaris. There would, however, be in both cases a certain amount of redness, while in the former some symptoms of exudation would be found, and in the latter, evidences of the disease would be seen on other portions of the surface. Besides these, there would in all probability be some subjective symptoms, itching, etc.

Prognosis.—The condition of asteatosis, though a disagreeable one, has no consequences of any moment. The question of its curability will depend upon its causation. In the acquired cases, from some of the causes mentioned, a cure can be obtained by the removal or avoidance of the injurious substances or occupations. In those secondary to other conditions and diseases, the prognosis will be doubtful. The development of an eczema on the affected surface is also possible and to be considered.

Treatment.—The treatment of asteatosis consists essentially in giving to the skin that fat or oil which is wanting. For this purpose any grease or oil may be used—cod-liver, linseed, olive, or sweet almond oil, lard, ungt. simplex, etc. The writer would particularly mention liquid albolene or benzoinol, which is much cleaner and more agreeable to patients, does not become rancid, or render the surface greasy and fatty, and yet at the same time gives all the benefit desired. When the other oils or ointments are used, advice in regard to bathing should be given, to guard against the injurious effects of the fatty substances becoming rancid. Besnier and Doyon recommend the production of excessive sweating after the inducing cause has been removed.

COMEDO. (George T. Elliot.)

Synonyms: Acne Punctata; Mitesser; Acné Ponctuée, Verres Bleues (Fr.); Blackheads; etc.

Definition.—Authors define a comedo as a collection of sebaceous matter in the excretory duct of a sebaceous gland.

Symptomatology.—Comedones are represented by slightly prominent or elevated, small discolored points, which occupy the external or follicular orifices of the sebaceous glands. They vary from a light yellow to a brown, bluish, and even black color, and they occur especially upon the nose, forehead and the cheeks, but frequently also on the temples, in the ears, over the back and chest, and on almost every other portion of the body. Cases have been recorded, in which they were present on the glans penis and on the prepuce, associated with atrophic scars around the follicular orifices. When the comedo is squeezed out with the fingers or with an instrument, a somewhat dense, resistant, more or less round or ovoid body emerges from the follicular canal, having its external extremity dark in color, while the lower end is soft and white. The comedo may also be squeezed out as a whitish, soft, filiform body, resembling very small vermicelli sticks (Brocq). These latter are not, however, true comedones, but they appear as small, papular, whitish elevations of the skin, the follicular orifice not being perceptible, or, at any rate, scarcely so. They are found especially on the temples, lobes of the ears and on the chest, and represent small retention cysts, the sebaceous matter being accumulated in the gland body while the duct is not concerned. (They should not be confounded with milia, for the contents of these latter can not be squeezed out by simple pressure.)

Comedones may be only a few in number, distributed here and there, or they may be excessively numerous, closely packed together, and giving the skin a discolored and dirty-looking appearance. They vary greatly in size, at times being very minute, consisting of small, dark points, as on the chin, to which they give a dusky look. Or, they may be quite large, as on the sides of the nose, the cheeks, in the ears and on the trunk. Not infrequently, a comedo does not occupy a single duct, but two and even more, the dark external points being grouped together, but separated by a narrow bridge of skin and subcutaneously communicating with a single cavity—double comedo of Ohmann Dumesnil. Crocker speaks of a variety of comedo, first described by Thin, which differs from the ordinary comedo in location, etiology, arrangement, and in the fact that they bear no relation to acne. These, which he terms **Grouped Comedones**, occur occasionally on the trunk, but especially on the cheeks and those parts of the body where flushing takes place, and they form "symmetrical groups of densely crowded black points." The individual lesions are smaller and more uniform than the ordinary comedo, and show no tendency to suppurate. He, as well as Cæsar and T. C. Fox, mentions the not uncommon occurrence of comedones in children, on the forehead and occiput in boys, the temples in girls, and the cheeks in infants. They are closely packed, often grouped, occasionally symmetrical, contain little fat, and do not inflame spontaneously.

The life history of a comedo is of variable duration. It may persist for a long time apparently undergoing no change, or, finally becoming loosened, it is removed by washing or rubbing. Or, it may be followed by inflammation in the tissue around and so lead to the formation of a pustular lesion—an acne pustule. Comedones are also frequently coexistent with a seborrhœa oleosa and a dilated condition of the follicular orifices in general.

Pathology and Morbid Anatomy.—Pathologically, a comedo is usually regarded as a collection of sebum in the duct of a sebaceous gland. The cells of the gland are accused of not undergoing complete fatty degeneration, and this condition, together with a loss in tonicity and contractility of the duct wall, leads to the formation of the sebum plug. Evaporation and absorption of the liquid elements causes hardening, while the constant supply of sebum produces gradual enlargement and dilatation of the duct. In some instances, the duct walls and the gland body itself may become completely destroyed from pressure atrophy (Baerensprung).

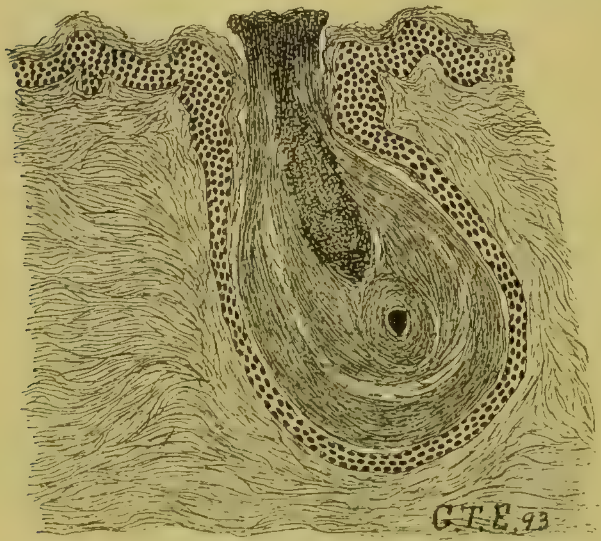


Fig. 88.—Comedo from back.

According to Unna, the development of a comedo is due to a thickening of the stratum corneum on the external surface and a consequent closure of the follicular orifice. The parakeratosis extends to the horny lining of the ducts, and the comedo is constituted by the epidermic scales thrown off in the canal and by a certain amount of sebum. This opinion appears to me to be certainly more satisfactory than the customary one of attributing it to sebum alone. Histologically, the outer envelope of a comedo is dense and horny in texture, and on cross-section it is seen to consist of several concentric layers of horny epidermis, surrounding a central core composed of sebum, lanugo hairs and epidermic scales. Besides, Biesiadecki demonstrated that the lanugo hairs, lying at a certain angle to the duct of the gland, frequently impinged upon the limiting wall of the canal, and Kaposi, therefore, attributes a hyperplasia of the horny lining to the consequent irritation, and thus derives the corneous envelope of the comedo.

The **acarus** or **demodex folliculorum** is often found in comedones. Of considerable importance in animals, it is of no particular consequence in human beings.

According to Dumesnil, the double comedo does not differ in origin from the ordinary variety, except that it has two ends. The formation of the single cavity, he would explain upon the supposition that two sebaceous glands lying close together became plugged up by comedones, and the accumulation of the sebum in both was so great, that the pressure exerted caused absorption of the intervening tissue and thus the formation of a single cavity.

The color of the outer end of a comedo has generally been ascribed to dust particles, dirt, etc. Unna claimed that it was due to ultramarine normally present in the cutaneous secretion, and also to a darkening of the horny plug from exposure to the air. His ideas have, however, not been accepted, in so far as the ultramarine is concerned. The pathological importance of the comedo is due entirely to the intimate relationship which it bears to acne. It is very usually the starting point of a perifolliculitis and a folliculitis, or, in other words, of an acne pustule. Histologically, "grouped comedones" and those of children are in no way different from those already described.

Etiology.—Puberty is regarded as a most frequent and common cause of the comedo formation. Kaposi considers the active hair-growth at that period of life as an important etiological factor, but he also admits that a want of tonicity in the walls of the canal is of considerable consequence. Besnier and Doyon, however, state more correctly that it is the physiological rather than the anatomical conditions in the evolution of the glands at the age of puberty that are to be considered. Besides these, general systemic disturbances—anæmia, cachexias, constipation, gastric and intestinal pathological conditions—are also mentioned as causes. Crocker states that dyspepsia is the most usual predisposing cause of "grouped comedones," while in children the origin of the lesions is purely local and due to a want of cleanliness. Not always, however, for the writer has seen comedones in babies and little children who were kept scrupulously clean. Comedones are not infrequently due to artificial causes, as from the use of substances which block up the orifices of the duct. Among these, tar may be mentioned, and the writer has seen most marked instances in workers in brass and iron factories or workshops, in firemen, stokers, oilers, etc., the comedones being due to the minute particles of iron, steel, coal, etc., with which the air in the factories was impregnated, and which choked up the orifices of the ducts. Want of attention to careful washing was a concomitant factor in these cases.

Diagnosis.—Comedones are easily recognized. Their usual localization and general characteristics would preclude errors in diagnosis being made, or their being mistaken for any other form of cutaneous lesion. Perhaps on casual examination—and it would then only be through carelessness—"gunpowder marks" might be mistaken for them, but the fact that the particles of the former are imbedded in the skin and can not be squeezed out, would readily differentiate the two conditions.

Prognosis.—The prognosis is a favorable one, except in so far that the comedo formation may subsequently lead to the development of an acne. The cases are, however, amenable to treatment, though a complete cessation in their development is obtained with difficulty. A disposition to the origin of a few always exists in those who have been afflicted with them at all severely.

Treatment.—The *systemic treatment* of patients with comedones will vary according to the etiological factor or factors in existence. Anæmia, constipation, and other functional irregularities should receive proper attention. If the patient is at the age of puberty, constructive remedies are indicated, such as iron, cod-liver oil, the hypophosphites, etc. In addition, the diet needs to be regulated, made plain and nourishing; sweets should, in the writer's opinion, be especially forbidden; and due attention should also be paid to general hygienic rules as regards open-air exercise, etc.

In the *local treatment*, the free use of soap and water is of primary importance. Soaps with sand or marble-dust have been recommended for the purpose of mechanically removing the comedones. Poultices of green soap, solutions of caustic potash, dilute acetic acid and other severe applications have also been advised, but in their use so much care is required that they had better be avoided. The writer would not recommend any particular soap, though in some cases the spiritus saponis kalinus, referred to in the treatment of seborrhœa, will be preferable to all others. Scraping the surface with a sharp curette has lately been recommended; but the procedure most advisable is that of squeezing or pressing out the comedo by means of the finger nails applied on both sides of it, or by the use of some one of the comedo extractors made by instrument makers. Very hot water and steaming of the face for the purpose of loosening the plugs are also popular remedies, but of doubtful benefit, if not distinctly injurious. The comedones being removed, applications may be made of alcoholic solutions of resorcin, three per cent or more, of boric acid, or of one containing sulphur, or of a mild astringent lotion, such as ℞ zinc oxid., magnesiæ carbonat., āā gr. xv, aq. rosæ, ℥ j, M.; to which tannic acid, gr. xx to xl, may be added. The lotions should simply be rubbed on with a small sponge or some soft cloth. The alcoholic or watery solutions may be often used advantageously in an atomizer.

Ointments are preferred by some authors, such as a three- to six-per-cent resorcin, a sulphur, or a white precipitate ointment; but they are, nevertheless, of only occasional benefit. In many cases of comedones, the local treatment demanded is that of acne in general.

MILIUM. (George T. Elliot.)

Synonyms: Grutum; Strophulus Albidus; Acné Miliare; Acné Albida; Tuberculum Sebaceum.

Definition.—A small whitish or yellowish-white body, situated in the skin just below the epidermis.

Symptomatology.—Milia occur on the eyelids and in their vicinity, on the face generally, especially over the malar prominences, on the temples, and also on the border of the lips. They may likewise be found on the penis and scrotum, particularly on the corona' glandis and on the labia, though more often on the inner surfaces of the labia minora. They develop slowly, and having reached a certain size, they remain stationary for almost any length of time, though they may disappear spontaneously by exfoliation of the epidermis over them. They vary in size from a grain of sand to a pinhead, and appear as white or yellowish-white bodies shining through the epidermis, but situated in the cutis, usually superficially, sometimes deeper down, being a little prominent, and having a rounded, spherical, and occasionally, an irregular shape.

If a milium be incised with a scalpel and lateral pressure applied, the small white body emerges easily, though at times it appears to be attached to a small pedicle. It is then seen to be round, or oval, or lobulated, or smooth, and it can be easily crushed to pieces.

Crocker mentions the occurrence of symmetrical grouped milia on the cheeks, similar in arrangement to the "grouped comedones." Milia are also very commonly seen at the inner acanthus of the eye in old people. On the penis and scrotum, they may coalesce to form lesions the size of a small pea or larger, and these may become very hard from the deposition of phosphate and carbonate of lime, forming then cutaneous calculi. Crocker speaks also of a special form, seen by himself, which occurs on the forehead and nose in old people. Around the glands there existed flat, pale-yellow, disklike accumulations, having a minute depressed puncture in the center. They were set very closely together, and suggested an "atheroma cutis."

Pathology and Morbid Anatomy.—Milia are usually considered to be due to retention of the sebaceous matter in the gland itself, in contradistinction to the comedo, which has the excretory duct for its seat. They are also attributed to the presence in the cutis of undeveloped glands, and A. R. Robinson thinks that they are of two kinds. The one is due to miscarried embryonic epithelium from a hair-follicle or the rete, has no duct, and contains no fatty epithelium; the other has a duct, contains cholesterin crystals and fatty epithelium and is in reality a deep-seated comedo. The writer would mention that in all his examinations with the microscope of milia he has never found any trace of a duct, and it would appear to him that obliteration of the canal was the primary cause in the development of the milium, while those lesions having a duct would appear to him to represent more correctly small retention cysts. *Vide* comedo. The formation of milia when obliteration of the canal had occurred, as in pemphigus, in cicatrices, etc., has been seen so commonly that this mode of origin can not be questioned. Kaposi attributes the formation at times of a milium to a hornification of the epithelium in the gland body, instead of its fatty degeneration, and some locate the lesion in the hair-follicle. Under the microscope a milium is found to consist of a mass of horny cells, arranged more or less concentrically around a central core composed of cells, and a small amount of fatty matter, the whole inclosed in a thin, simple, or lobulated envelope.

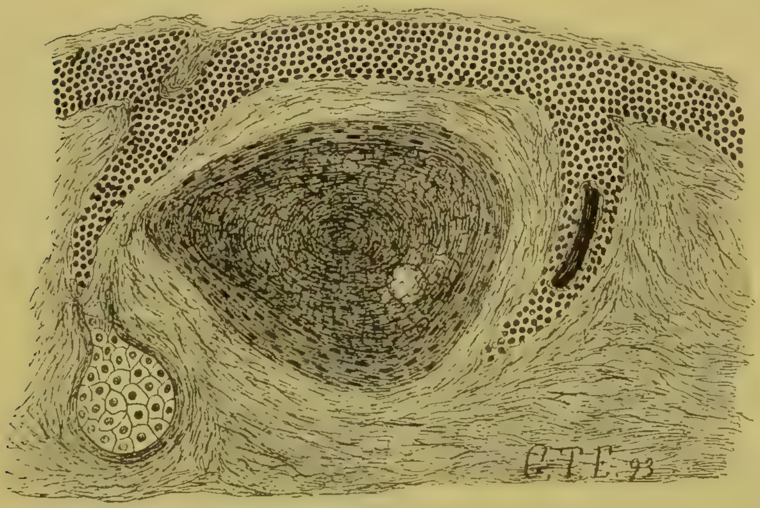


Fig. 89.—Section through a milium.

Etiology.—Milia are very common in children and in young adults, but it can not be said that their formation is influenced in any way by the condition of the general system. They often arise without any apparent cause and also appear in connection with acne. Upon surfaces, upon which pemphigus bullæ have occurred, they may form in great numbers, and likewise after superficial ulcerations caused by erysipelas, along the edges of cicatrices resulting from ulcerations of syphilis, lupus, burns, etc.

Diagnosis.—When located about the eyelids, milia may be erroneously taken for xanthoma. Yet the latter are usually larger than milia, they are more of a buff color, irregular in shape, and when incised can not be squeezed out.

The prognosis is always good. They produce no discomfort and relief is sought only on account of their appearance. Occasionally from irritation, they may become inflamed and suppurate.

Treatment.—Internal and systemic treatment is not indicated, the only means by which milia can be removed being such as are mechanical. The overlying tissues should be punctured with a sharp-pointed bistoury or scalpel, and then slight pressure causes the little bodies to come out. If they show a tendency to recur, the cavity may be touched with nitrate of silver or iodine. Hardaway recommends electrolysis. In infants, soap and water is all that is necessary.

Frequently patients object to their being incised, and in such cases, remedies may be used to produce marked exfoliation of the epidermis, such as washing with spiritus saponis kalinus, and then applying twenty-per-cent resorcin, or ten-per-cent acidum salicylicum, or beta-naphthol in ointment form or in my Bassorin paste. Persistence with these will usually remove the milia, but the methods first mentioned are far preferable.

STEATOMA. (George T. Elliot.)

Synonyms: Sebaceous Cyst; Atheroma; Balggeschwulst; Loupe; Wen.

Definition.—A steatoma is a cystic tumor containing sebaceous matter.

Symptomatology.—Atheromata appear as rounded, oval, in certain localities, somewhat flattened tumors of variable size and consistence. They occur in both sexes, rarely in children, but more usually after the age of thirty. They may develop on any part of the body, but they occur most commonly on the scalp and the face, yet they are seen on the scrotum, labia majora, neck and back, and also on the palms and the soles, roof of the mouth, and, in some few cases, more or less generally over the body. They occur singly or in numbers, at times grouped together and so aggregated as to appear as one irregular-shaped tumor. They vary in size from a small pea to a hen's egg and even larger, and some may even from their weight become pedunculated and hang loosely from their attachment. The smaller ones, being situated entirely in the cutis, move with the skin, but the larger ones may themselves be freely movable. They may become firmly adherent to the skin when they have become inflamed. The skin itself over an atheroma is usually normal in color and thickness, or it may be reddened and thickened. Over large ones, it is usually stretched and thinned, atrophic and pale in color, and the whitish contents of the tumor may be seen shining through. The consistency of the steatoma may be doughy, even soft, or, on the other hand, when small or a long time present, dense and hard. It depends also upon the quality of the contents. On the surface of some atheromata, a small opening may be seen and by pressure some of the contents may be expressed, or there may be only a slight puckering as an indication of the original insertion of the gland duct. No trace whatever of such an opening is, however, found in many cases, especially in the larger tumors. Over the large cysts located on hairy parts, particularly on the scalp, there is usually an entire loss of hair, it being destroyed by pressure atrophy. There are no subjective sensations accompanying sebaceous cysts. They develop very slowly, without attracting attention, and, after reaching a certain size, they may remain stationary for a long time or cease growing altogether, their contents undergoing hornification or calcification. From time to time, from some of the tumors, atheromatous masses may be discharged, no change being, however, observable in the intervals. When, from its location, the cyst is exposed to irritation, it may become inflamed, or, when its external wall is very thin, it may burst, and after some of its contents have been emptied, the opening closes up. This may be repeated from time to time, when, infection taking place, inflammation and suppuration ensue. The tissues surrounding the atheroma become red and painful, the contents of the cyst liquefy and are mixed with pus and the matter discharged is offensive. The suppuration may destroy the cyst wall completely, but more often a portion of the contents remains behind and the inflammation continues. As a result, the cyst cavity may fill up and empty repeatedly, or a fistulous connection with the external surface may be formed. Further changes may take place, and an ulcer with elevated infiltrated edges and a fungating base may develop and show no tendency to heal. The discharge from such an ulcer forms crusts upon the surrounding skin, the subcutaneous tissue becomes infiltrated, the neighboring lymphatic glands are swollen, and the resemblance to an ulcerating malignant growth is very striking.

An atheroma may undergo malignant degeneration, carcinoma developing on its base, and calcification or osteification may also occur. Large cysts in elderly people may produce erosion of the bones of the skull and even perforation has taken place.

Pathology and Morbid Anatomy.—Steatomata are generally said to be accumulations of sebaceous matter and epidermis in the sebaceous follicle. Virchow classed them with retention cysts, but Winiwarter states that they should be more properly included among the cysto-adenomata, in which there is primarily a new formation of gland tissue and afterward a transformation into a cystic tumor. More lately Török claims that his investigations show that a great portion of steatomata are more properly dermoid cysts, and Chiari has arrived at the same conclusion.

Histologically, the capsule of the cyst is composed of connective tissue, which may be thin, especially over the portion facing the external surface, or hard and dense and poor in cellular elements and in blood-vessels. This wall is lined internally with concentric layers of pavement epithelium. There are, according to Török, papillæ, but other writers only mention their absence, though it is stated that papillomatous proliferation may occur, and to such a degree as to fill up the cavity. The contents vary greatly in consistency and in character. In the smaller cysts, white stearinlike masses are found, while in the larger, there is an emulsionlike milky fluid in which whitish granular masses are suspended. These latter consist of gland cells in a state of fatty degeneration. Free fat, cholesterin crystals and lanugo hairs are also present. Török found fat only exceptionally in the cysts. In some atheromata, the contents may be like honey, or yellow and oily, or fatty and soft like lanolin. In others, the external portions may have become horny, while the more central are still fluid.

Etiology.—The origin of an atheroma is frequently ascribed to the same factors as were claimed by Biesiadecki for comedones and which have already been mentioned. Erysipelas has been observed to precede the formation of steatomata and they have originated frequently after wounds. Individual predisposition and inheritance have also been regarded as etiological factors, but undoubtedly many sebaceous cysts originate without any traceable cause. If they are, as Török and Chiari claim, dermoid cysts, their probable development from embryonic remnants in the skin has to be borne in mind.

Diagnosis.—Steatomata are readily recognized, especially if the communicating duct is open and some of the cystic contents can be pressed out. The history of the development of the tumor should prevent its being taken for a cold abscess, though when inflamed and suppurating, the differentiation from an ordinary abscess may only be possible by a microscopical examination of the cystic contents. Lipomata and fibromata can also be mistaken for a sebaceous cyst, but more usually when the latter is in an unusual situation. When the atheroma has ulcerated and is fungoid in character, it may resemble to a marked degree an ulcerating tubercular or cancerous growth, but the history of its origin, and especially the microscope, will prevent an erroneous diagnosis.

Prognosis.—There are no particular injurious consequences or results to be expected from steatomata, and therefore the prognosis may be said to be good. There being also no pain or other subjective disturbances, their presence is undesired only on account of their appearance. Still, it must be remembered that they may form the starting point for a carcinoma or for a cutaneous horn.

Treatment.—Complete destruction of the cyst wall is the prime requisite in the treatment of an atheroma, as simple evacuation of the cystic contents is useless. In order to destroy the wall, a choice may be made of surgical means, or of caustics, or of some substances which act by producing a certain degree of inflammation. If the former are employed, an incision is made over the cyst and its wall is dissected out, before or after the contents have been removed by puncture. On account of the possibilities of wound infection occurring, and for the cosmetic result, the operation should be carried out with all due regard and consideration for surgical antisepsis.

Among caustics, a sharp-pointed stick of nitrate of silver is used. It is bored into the cyst cavity, and after the eschar has separated, the wall can be removed with the forceps. This procedure is applicable to small atheromata. For large ones Vienna paste is recommended. The tumor is circumscribed by means of surgical plaster and the paste is applied for fifteen to twenty minutes. When the eschar separates, the cyst wall comes away with it. The application is very painful, but is said to leave a very slight scar. A chloride-of-zinc paste is also advised. Lately the following method has been recommended by Le Fort: A sharp-pointed piece of wood dipped in fuming sulphuric acid is drawn linearly over the atheroma until the skin can be bored through; the surface is then covered with some dressing, and when the eschar separates (in two to three weeks) the wall can be easily squeezed out by light pressure. The writer has obtained most admirable results from this method in steatomata of the scalp, a very slight scar only being made.

Besides these procedures, the extirpation of the sac has been attempted by injecting into the cyst cavity alcohol, or tincture of iodine, or iodoform-ether, or nitrate-of-silver solutions. The injection method offers no advantages over the others.

ACNE (Vulgaris). (George T. Elliot.)

Definition.—Acne is a disease of the sebaceous glands of the skin and of the follicles of the lanugo hairs attached to them—a folliculitis and a perifolliculitis—and is characterized by their inflammation, suppuration and frequently, by their complete destruction and the production of scars.

The term *acne* is qualified according to the clinical characteristics of the lesions, the age of the patient, etc., in many ways, as vulgaris, pustulosa, juvenilis, adolescentium, tuberculatum, and so on, but they being only expressions of certain salient points in individual lesions, or in collections of cases, it would appear preferable to treat of it in the two classes of *acne simplex* and *acne indurata*, the former representing the more superficial form of the disease, the latter having reference to the deeper seated variety. A third division of acne is also made (*acne rosacea*), but this being an acne plus a rosacea, or, in other words, a combination of the two diseases, it will be described separately.

Besides these, several other eruptions are included under the name of acne, in accordance with their general morphology—*acne cachecticorum* or *ulcerosa*—or with their artificial origin—*acne picea;* the folliculitis and perifolliculitis of flax-spinners (Purdon); the acne of workers in oils and grease (H. Leloir), or with their production through the administration of certain drugs—iodine and bromine acne. Lastly, *acne varioliformis* (Hebra) is usually included in this category, though with questionable right.

Symptomatology.—**Acne Simplex.**—Acne simplex is more frequent than the indurate form, and occurs very usually in young people, developing about the age of puberty. It may, however, begin later, and even much earlier, the writer having seen cases in children from three to ten years of age. It would appear to be more frequent in females than in males, but this ratio is probably only a relative one, owing to the proneness of the former sex to consult in regard to cutaneous troubles. The lesions are distributed over the affected portion of the skin without regularity, or arrangement, or symmetry, being, however, usually bilateral. Frequently, one side of the body will be much more severely affected than the other, and the writer has seen cases in which the eruption was almost entirely unilateral. The location of acne simplex is especially the cheeks, forehead and chin, but it often occurs on the chest and back, over the shoulders, and sometimes on the upper arms and on the thighs. The lesions consist of comedones, papules and pustules. The comedo constitutes a central point around which the inflammatory reaction takes place and forms the papule, which later becomes a pustule. The progression of one step to the other can usually be traced upon the affected surface, and the dark head of the comedo may be easily recognized about the center of the pustule. Some of the lesions also arise independently of the comedo, or without this latter being apparent. The pustule having developed, it persists for a few days, then the redness begins to fade, a crust forms and after its fall, a slight stain, or scar, or pitting remains. All of the lesions do not, however, become pustules. Many do not develop beyond the papular stage, and, having attained that, begin to undergo involution. Nor do all the comedones which may be present become foci for the origin of acne lesions but many remain unchanged. In consequence, on the face or back, or other surface, there will be found a more or less extensive aggregation of all stages—comedones, papules, pustules, crusts and staining or scarring—being distributed without arrangement or regularity, the whole constituting that most annoying disfigurement known to the laity as a "pimply face." Bulkley states that suppuration of the acne lesions occurs more commonly in strumous subjects than in those who are gouty or neurotic, but yet no rule can be laid down, and, irrespective of either of these diathetic conditions, papular or pustular examples of acne may be very frequently seen.

There is very little subjective disturbance accompanying the lesions of acne. They are sometimes slightly painful, especially if handled, but more often not. Occasionally, cases are seen in which itching and burning are complained of.

The scars or stains, which mark the site of a former lesion, vary greatly in size and character and abundance. Often absent altogether, in certain cases they constitute a very marked feature, almost every pustular lesion producing a slight loss of tissue. The scar is usually superficial, a slight pitting, and after remaining dark red or purplish for days and weeks, gradually becomes white. They will often, in the course of time, smooth out entirely, leaving no evidence of their existence, though for quite a while after their formation their site may become congested and apparent after washing with cold water or on exposure to cold. When a lesion of acne simplex is opened and squeezed, a little pus and blood and sebaceous matter appear, and at the same time the comedo is extruded. The opening heals rapidly and the process is at an end as far as that gland is concerned. Whether it is the face or some other portion of the body which is affected, the same symptoms occur, only the lesions on the back and chest are somewhat larger and suppuration, in the writer's experience, is not so common. The course of acne simplex is essentially chronic and may last for years, the same train of symptoms continually developing, though in individual cases the acuity of the inflammation and of the course of the separate lesions may vary greatly. It may, however, become transformed into an acne indurata, the deeper-seated variety of the disease, and, in fact, both forms very commonly coexist. Secondarily, a rosacea may develop.

Acne Indurata.—In indurate acne, or the deeper seated variety of the disease, comedones may be present; but they do not constitute an essential part of the process, nor do they stand in that direct association with the lesions as they do in acne simplex. In acne indurata, not only the glands themselves, but the surrounding tissues also are inflamed, the lesions being of the size of a small pea and larger up to that of a nut. They begin as deep-seated indurations, which enlarge and become red or purplish in color, run a somewhat indolent course, and require some days, and even a week or more, to soften. In shape, they are rounded, often irregular, elongated, and, by the implication of several contiguous glands, lesions may arise which resemble closely small abscesses. The suppuration is sometimes active and the lesion is transformed into a soft, fluctuating pus cavity, over which the skin is of a dark, purplish red; or, the lesion is more indolent, only a small amount of pus forms in its central portion and it remains hard and indurated. Spontaneous rupture and evacuation of its contents do not occur, and if the lesion is not opened, it remains for days and even for many weeks, slowly undergoing resolution. If in any way opened, it may discharge a certain amount of its contents, then, closing up, it refills again, and it may do this several times, or until the "core" has been removed. The lesions are often very painful of themselves or when handled, though as a rule, there is not much discomfort experienced from them.

Acne indurata in its involution is very apt, though not always, to leave marked scars. They are of no particular shape and remain livid and purplish for a long space of time. Keloidal degeneration of the cicatrix, with a tendency to steady growth, may sometimes occur, but especially over the chest and back. In two instances treated by the writer, almost every lesion had undergone this change and the growth of some had attained a size of two inches by one inch. In other cases, the writer has met a species of fibroid degeneration of the acne lesion. The latter apparently did not suppurate, but became hard, the redness faded, and the lesion remained as a circumscribed indurated growth in the cutis during an indefinite period of time without undergoing any change.

The localities affected by acne indurata are the same as have been mentioned for acne simplex, but yet it is more commonly seen on the neck and on the trunk than is the latter form. There is no limit to the number of lesions which may be present. They may be distributed only here and there, or be aggregated closely together, separated by only small areas of healthy skin. In this way, the entire back may be literally covered with lesions in all stages of development. In common with the more superficial form, acne indurata has a tendency to run a chronic course and to persist for years. In fact, it is doubtful if it ever disappears entirely in a spontaneous manner, as is sometimes the case with acne simplex. As complications of both varieties of acne, seborrhœa oleosa is undoubtedly the most common, and it exists perhaps in the majority of cases. In the writer's experience, that affection known as seborrhoic eczema is also a frequent complication, especially in those cases in which the majority of the lesions occur just above the root of the nose, on the nose itself and the neighboring portions of the cheeks and the chin, and particularly in those cases in which itching is complained of. Of course, acne may coexist with any other cutaneous disease.

Acne Cachecticorum.—The form of eruption to which the name of *acne cachecticorum* is given occurs in poorly nourished, marasmic, strumous, or scorbutic individuals, often in combination with lichen scrofulosum and with tubercular glands of the neck or of other regions. Kaposi, however, mentions a case which developed in a healthy man in consequence of mental depression.

The eruption occupies especially the trunk and the lower extremities, but also appears on the arms and to a slight extent on the face. The lesions are of pea to nut size, of a livid red, flattened and flaccid, and contain only a small amount of seropurulent fluid. Ulceration occurs under the crusts, and at times hæmorrhages take place into the pustules. When the lesions heal, long-persisting purplish and livid scars remain. In some cases, the hands are affected, become œdematous and bluish-red, and on the palms, nodules and pustules may develop.

Severe cases of acne indurata may be mistaken for acne cachecticorum, especially if widely distributed. It is extremely doubtful if the process is an acne at all. Its symptomatology and general characteristics would suggest, that it was more probably a "scrofuloderma," and its frequent association with lichen scrofulosum, which, in recent times, has been claimed to be a tubercular affection, would tend to point in that direction.

The two forms of acne known as the *Iodide* and *Bromide Acne* are drug eruptions. The iodic eruption occupies much the same territory that ordinary acne does, and consists of hard papules, which may enlarge and become surmounted by small pustules. There are no comedones, and it appears as an acute eruption and does not run the chronic course of acne. Often, it is accompanied by other symptoms of iodism. The bromide acne has the same location, and its lesions are papules, tubercles and pustules. It shows special preference for the hairy parts, as the scalp and the eyebrows, and many of the pustules are found pierced by a hair. Artificial acne may be purely local in origin, being represented by the acne picea or tar acne, chrysarobin acne, etc., and the folliculitis and perifolliculitis due to certain occupations.

Acne picea develops upon those regions upon which tar has been used, or which have been exposed in some way to its action. The follicular openings become blocked up by the tarry plugs, which act as irritants and lead to inflammation of the perifollicular tissue and the formation of a papule. The resemblance to a true acne is very distinct, the plug being substituted for the comedo in the lesion. Pustulation may also occur. The same results may be produced by the use of chrysarobin.

Purdon described the folliculitis in flax-spinners as occurring especially in young girls, and of being located usually on the face and extensor surfaces of the arms. The lesions consist of papules capped by a black speck occupying the follicular orifice. Leloir, on the other hand, found the eruption almost exclusively on males, and situated on the prominent portions of the lower extremities. The lesions were the same, and he attributed them to constant contact of the oils and grease used by the spinners, which determined a folliculitis and subsequently a perifolliculitis.

Acne Keratosa is a name suggested by Crocker for an eruption characterized by the formation of a horny plug in a follicle, presumably the hair and not the sebaceous follicle, which excited inflammation and the development of firm conical papules, with subsequent transformation into pustules. Pigmentation and scarring were the ultimate results.

Adenoid Acne, according to Crocker, should replace the term **Disseminated Follicular Lupus** of Tilbury Fox. These cases have been described by Unna as miliary lupus, and the writer has examined several microscopically, but found them unconnected with the follicles. On the contrary, the lesions proved to be tubercles of tubercular lupus.

Besides these, the term *acne* is qualified by many adjectives, but since the names represent only stages of the disease, or totally distinct cutaneous processes, it is unnecessary to describe them here. *Acne papulosa*, *pustulosa*, *disseminata*, *tuberculata*, etc., are only stages or forms of lesions seen in acne, while *acne molluscum* is molluscum contagiosum; *acne sebacea* represents seborrhœa oleosa; *acne chéloidienne* is dermatitis papillaris capillitii; *acne pilaire* of Bazin is acne varioliformis of Hebra, etc.

Pathology.—Pathologically, *acne* is an inflammation of a sebaceous follicle, resulting in its suppuration and in a greater or lesser degree in its destruction. The pathological cause may be either the comedo, or some other agent which blocks up the follicular orifice and acts as a foreign body, or, through some chemical change, produces perifollicular congestion and inflammation; or, it may be some pathogenic micro-organisms, which have penetrated into the follicle prior to its closure, or which have been carried to it by the circulation. It may also be some virus, poison, or leucomaine, which is sought to be eliminated from the system by the glands, and which acts as an irritant and causes a perifollicular inflammation and subsequent implication of the follicle. According to some writers, the initial point of irritation is nearly always the hair-follicle attached to the sebaceous gland, while the latter plays a passive *rôle* and is only secondarily attacked. The writer in his microscopical studies of acne has, however, found the primary inflammatory changes frequently entirely independent of the hair-follicle.

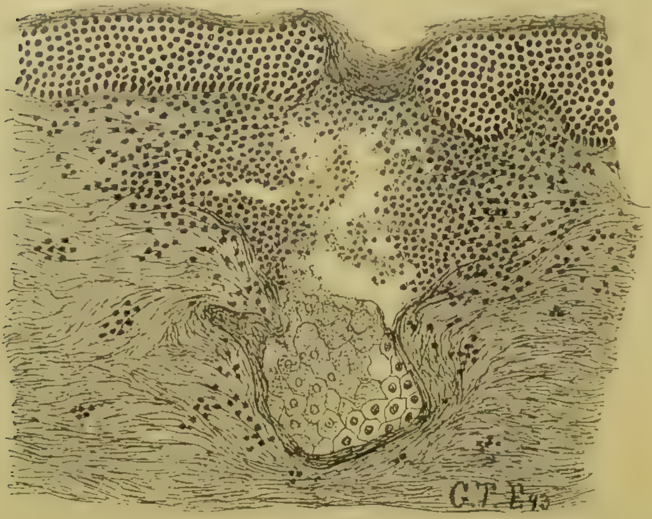


Fig. 90.—Section through a superficial acne lesion (acne simplex).

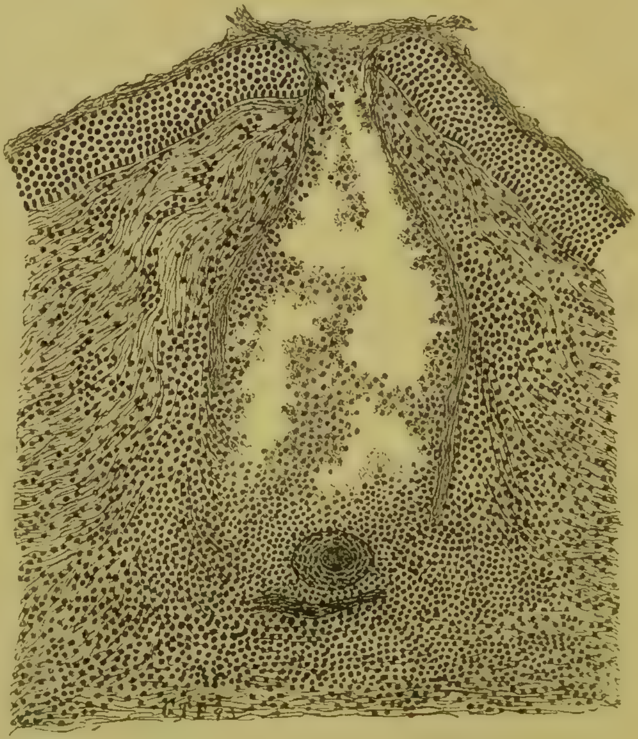


Fig. 91.—Section through an acne indurata pustule.

Whatever may be the agent causing an acne lesion to form, the symptoms of inflammatory reaction which take place are situated in the tissue around the follicle. The process thus begins as a perifolliculitis, and only subsequently is the follicle itself invaded. The tissue presents the appearance of inflammatory infiltration, but, according to Unna, this infiltration is composed of plasma, large fusiform and "mast cells," and a few giant cells, while leucocytes do not appear except with the suppuration of the follicle. This occurs, in his opinion, secondarily and not necessarily. The amount of infiltration in the tissues is very variable. It may be limited to the upper portion of the cutis about the gland duct, or it may be located especially about the body of the gland, or it may extend widely throughout the corium, several contiguous glands being affected and merging into a whole. In acne simplex, the writer has found the former to be the case, while in the indurate form, the opposite took place. The walls of the gland are ruptured in places, its cavity distended and filled with serum, sebaceous *débris* and pus cells, though in acne simplex, portions of the glandular epithelium may still be seen intact. Leloir and Vidal mention also the occurrence of small suppurating foci outside of the gland, which ultimately rupture into its cavity. In the contents of the glands, by proper staining, micrococci are abundantly found. The sheath of the follicle sometimes remains intact, but it may melt away under the influence of the suppuration and only the hair itself be left.

Etiology.—Age is usually regarded as an important factor in the etiology of acne, and certainly the large majority of cases begin about the age of puberty, or at that time when the body undergoes manifold changes, and great tendencies exist to disturbances of the glandular secretion, of the functional health and of the tissues in general. The largest number of patients seen are between the ages of fifteen and twenty-five, and it is even said to disappear entirely after thirty, but there are so many exceptions, that a rule in this regard can not be laid down. In the writer's experience, however, acne simplex is much more common prior to the age of twenty-one, and acne indurata more frequent after that age. Among etiological causes, great stress is also laid upon menstrual and uterine disturbances, and they certainly may act as predisposing causes to some extent. It is also of frequent observation to see an acne become aggravated just before, during, or after a menstrual epoch. Still, too much influence should not be ascribed to these disturbances, for the reason that they may be entirely cured and yet the acne will remain, or the acne may be completely removed even though the uterine or ovarian disturbance persist.

Constipation is a most frequent cause, as well as lowered nutritive conditions of all kinds—anæmia, chlorosis, debility, too rapid growth. Bulkley mentions disorders of circulation, weakened heart-force, as shown by cold hands and feet, palpitation, etc. Gastric and intestinal disturbances of all sorts are also important factors. Barthelemy speaks of dilatation of the stomach as being frequent. The writer would mention particularly fermentative intestinal dyspepsia as having been the most common predisposing cause in his cases, while a history of gastric dyspepsia was infrequently obtained. Mental and physical exhaustion, excesses in *baccho et venere*, masturbation, are also included among the causes of the disease, and, according to Sherwell, urethral irritation is a very common factor in young boys. Sedentary life, gouty diathesis and struma, to which Bulkley would particularly ascribe acne indurata, may also be mentioned, while undoubtedly external or local causes also play some part. Exposure to cold winds, to irritation of some kind, inattention to cleanliness, etc., undoubtedly act to some extent as predisposing causes, for it is that surface which is more especially and continually exposed to changes of temperature, to irritation, to dust, etc.—viz., the face—which is the usual site of an acne, while other surfaces almost, if not quite, as rich in sebaceous glands—the back and the chest—are comparatively only infrequently affected.

Among the occasional predisposing causes for acne, rhinitis may be mentioned, or more particularly, according to Seiler, the atrophic form of the disease. Diet may also frequently act injuriously, and either originate the process by means of the functional disorders which an improper regimen may lead to, or it may aggravate an already existing acne. Sweets of all kinds, pastries, etc., cheese, highly seasoned and rich food, fermented liquors, etc., are some which may be referred to.

Diagnosis.—Acne is so common a disease that its diagnosis should offer no difficulty. More especially is this the case in acne simplex, in which the presence of the comedo, and the formation of the papule and pustule around it, point directly to the sebaceous gland as the seat of the inflammatory disturbance. It may, however, be confounded with a papular eczema, but the lesions of eczema are smaller, occur in patches, and show evidence of exudation and scaling. They are also accompanied by marked itching. The pustular syphilide may also be easily differentiated from the fact that they show a tendency to group together, and if the crust which caps the infiltrated base is removed, a punched-out ulceration, filled with a seropurulent fluid, and bounded by a slightly elevated, infiltrated wall, is revealed. Acne indurata and the tubercular or cutaneous gummatous syphilide may be confounded, but the latter is generally more circumscribed, occurs in groups, undergoes softening and ulceration, and very usually follows a serpiginous course. When the syphilide is located on the nose, the differential diagnosis may often be extremely difficult.

Acute cases of acne are said to resemble at times variola, but the absence of constitutional symptoms would alone be sufficient to distinguish it from that disease.

A form of eruption which is not infrequent, and is usually confounded with acne, should, in the writer's opinion, be differentiated from it. It is that papular outbreak, with occasionally a few pustules, which occurs very frequently in women at the time of menstruation. It appears on the face and sometimes the shoulders, suddenly or overnight, a few days before, or only during, or after menstruation, and it may consist of a few lesions, but more often it is quite abundant. The lesions are frank papules about the size of a small pea, inflammatory in character, and itch and burn somewhat. Only a few of these become pustular, but as a rule, they remain during menstruation and for a few days after, and then disappear entirely or leave a slight stain, and there is freedom until the next menstrual epoch. The lesions do not contain any comedo, nor when opened any sebaceous matter, and the writer has found them to be entirely unconnected with the sebaceous glands. They represent a form of papular erythema of reflex origin, and the eruption is mentioned for the reason that it is always thrown into the same category with acne.

Prognosis.—The prognosis of acne is usually, in fact almost invariably, good—that is, a cure can be obtained. Some writers claim that it will undergo spontaneous cure in the majority of cases before twenty-five years of age, or at any rate by that of thirty. The large number of cases treated by the writer, which were past twenty-five and thirty years of age, would lead him to make other conclusions. It must also be remembered, that the same general causes which produced the disease at one time may recur and the acne then reappear. In consequence, the prognosis will depend upon the care the patient will take to avoid those predisposing causes, which in any given case have been found to favor the development of the disease. Of course, much can be done by proper general and local treatment, but in answering a patient's usual query as to the possibility of obtaining a permanent cure, the prognosis should be formulated according to the probability of the patient observing that care which his or her condition demands.

Treatment.—It is impossible to give all of the methods, procedures, remedies, etc., which have been recommended or are in use for the treatment of acne. The measures employed are both general and systemic, internal and local, but in no sense of the term is there any specific medication possible. The *internal treatment* will have to be guided by the nature of the functional or other disturbance which may happen to be present in any given case. Constipation should be relieved by cascara sagrada, or rhubarb, or aloin, or by any other remedy preferred, or simply by means of diet, proper exercise, massage, or the use of the cold douche over the abdomen. Gastric or intestinal disturbances of every kind should receive proper attention, and the mineral acids, pepsin, etc., be administered, or calomel, or resorcin, or sodæ sulphocarbolate, or other intestinal antiseptics. If debility or anæmia exists, then iron, nux vomica, hydrargyrum bichloridum, the vegetable bitters, tonics, etc., are indicated. In tubercular subjects, cod-liver oil will often be valuable; in gouty individuals, alkaline mixtures, the potash and lithia salts, etc. In other words, the search for an internal specific for acne is useless, but the patient should receive such remedies as are indicated by the nature of the functional or other somatic disturbances present. Of the specifics more or less recommended, sulphide of calcium may be mentioned. It is given in one-sixth to one-fourth-grain pills every two hours when there is much suppuration. The writer has never observed a particle of benefit from its use alone, though when the alimentary tract was also treated, the diet was regulated and local treatment was given, then good effects were obtained, but the same result was seen also under those circumstances and without the calcium. Glycerin in doses of ʒj to ʒij is also advised.

The writer has used it for flatulency and intestinal fermentation for a number of years, and would attribute its beneficial effect in acne to its rectification of these conditions, rather than to any direct effect upon the cutaneous disease. Arsenic is usually presumed to be the sheet-anchor in the treatment of acne. Fowler's solution, the liquor sodæ arseniatis, and acidum arseniosum, are all used, and more lately Piffard has recommended the bromide of arsenic. In small doses it is useful in cases in which more or less anæmia is present, or some grade of debility, or when the lesions are more of the papular variety. In acute cases and in those in which the inflammatory reaction is marked, it is usually harmful and should be avoided. Ichthyol is recommended by Unna as being of great value. The dose is from five to fifteen grains, three times daily, in solution or in capsule. It is especially indicated in those cases complicated by a marked seborrhœa oleosa, and when the process is sluggish, the lesions are indolent and tend to leave purplish and livid scars.

The diet in acne is of considerable importance ; in fact, Fox attributes more to its regulation than to the use of either internal or local medication. The diet should be nonstimulating, and highly seasoned dishes and indigestible food should be avoided ; particularly pastries, sweets, candy, etc., should be forbidden. Beer and alcohol are contraindicated, but the use of a light claret or Rhine wine with meals is allowable. Champagne is usually injurious. Butter, milk, cream, and fats in general are not to be forbidden unless they cause gastric or intestinal derangement, and in many cases they will be decidedly advisable. The same remarks are pertinent as regards tea and coffee. If found to be injurious, they should be omitted from the diet list ; otherwise they can be drunk. As a whole, the diet should be plain, simple, and nourishing, and so constituted as to be easily digested, and to remedy those defects in nutrition which may be present. At the same time, general hygienic laws should be laid down. Exercise in the open air, change from a sedentary to a more active life, proper amount of bathing and attention to personal cleanliness, early hours, avoidance of dissipation or excesses of all kinds—all of these should be means made use of in the general treatment of acne.

The local treatment of acne is, however, of paramount importance ; for, though the internal medication may remove the predisposing causes to the disease, yet it is the local remedies which really bring about a healthy action of the skin and a cessation of the process. The writer has frequently *heard* of cases of acne cured by internal treatment alone, but has never seen any, though he has himself repeatedly endeavored to obtain that end in practice. Besides, there are many cases which require only local treatment for their cure.

The first principle in the local treatment is the use of soap and water.

The affected surface should be thoroughly washed night and morning. Any good soap may be used, or, if there are many comedones, the marble soap of Unna, or a sand soap, or sapo-viridis, or the more elegant spiritus saponis kalinus. Lately, the superfatted soaps manufactured in Germany have been recommended, especially such as contain sulphur, or ichthyol, or resorcin, or mercuric chloride. Thorough, brisk rubbing with an ordinary toilet soap will, however, be all that is necessary. As a rule, hot water is recommended. It should be as hot as the patient can bear, and should be applied over the face by means of a folded handkerchief or cloth during a space of several minutes every night. When there are many comedones, steaming of the face is also advised; and after the face has been treated in either one of these ways, then the external application ordered should be rubbed over the skin. The writer would deprecate very strongly the use of either of these procedures, as, in his experience, he has found them both to be harmful, increasing the amount of the eruption, inducing frequently a seborrhœa oleosa, with dilated follicular orifices, and leading to the development of a rosacea. He has observed that they often cause persistence of an acne and constant relapses, and has in many instances been able to obtain cessation of the process by expressly forbidding patients the use of hot water. Furthermore, since the introduction of "face steaming" to the laity by "complexion artists," he has observed any number of cases intensely aggravated and most unfortunate conditions produced. It is far better to use water which is cool or tepid, so as to avoid the shock which either extremely hot or cold water produces upon the peripheral circulation when applied to the skin.

The comedones may be dealt with in the manner described under that section. Hebra, Jr., first advised curetting the skin for acne, and Unna, Fox, and Brocq recommend it. The operation is done with a dermal curette, and the surface is gone over once every ten days or more. It is also of importance, according to authors, to open all pustules and to evacuate their contents. This may be done with a sharp-pointed bistoury or other instrument. There are, however, objections to this, on account of the amount of scarring which is liable to be produced. For a number of years the writer has given up this method, and has found that, though the lesions required a little longer time to disappear, yet scarring was much less liable to occur. His reasons for discarding it were, that a distended cavity existed, which, if suddenly emptied, resulted in a collapse of its walls and a certain degree of displacement of the surrounding tissues; whereas if the process which led to the cavity formation was halted by some other means, then gradual absorption of the contents took place, and more or less restitution of the empty space was obtained. In practice this result has been a matter of continual and customary observation. Vidal recommends linear scarifications in obstinate cases, and Brocq mentions electrolysis as a means for removing deep-seated indurations. The local remedies used for acne are innumerable, but all those which are of benefit are to a certain degree antiseptic in action. In cases which are acutely inflamed and active, soothing applications are at first preferable, such as a two-per-cent salicylic acid ointment, or a lotion of ℞ Magnesiæ carbonat., oxidi zinci, āā gr. x ad xx; aq. rosæ, ℥ j, M.; or calamine may be substituted for the magnesia, and, if desired, acidum carbolicum (gr. x ad xx) may be added. A dilute lead or a bismuth lotion will also be of benefit. They may be applied at night only, or also during the day. The majority of the cases of acne are, however, chronic in type, and more stimulating applications are needed. Those which contain sulphur are of particular benefit. Piffard recommends sulphur mixed with any good face powder in the proportion of one in four. Unna uses a paste containing ten per cent of sulphur. Others advise a sulphur ointment or lotions containing sulphur, as: ℞ Sulph. sublimat., ʒ ij; ether, spts. vini, glycerin, āā ʒ ij; aq. calcis, aq. rosæ, āā ʒ iv. M. (Crocker); or, ℞ Sulph. lactis, ʒ iv; tinct. saponis virid., ʒ x; glycerin, ʒ vj; alcohol, ℥ j (Elliot). Possibly the most useful of all is: ℞ Zinc sulphat., kali sulphuret, āā gr. x to xl; sulph. lactis, gr. xx ad l; aq. rosæ, ℥ j. M. They are usually applied at night and washed off the next morning. If irritation is produced, a little cold cream and powder can be used during the day. It is often advisable to keep up the treatment during the daytime also, and a resorcin two- to five-per-cent lotion, or a boric-acid solution may be applied. Potassium sulphide, ʒ j, in rose-water, ℥ iv, is also recommended, as well as solutions of mercuric chloride in various strengths. A favorite application with some authors is: ℞ Hydrarg. bichlor., gr. xv; ammonii chlorid., gr. xxx to lxx; alcohol, ℥ iv; aquæ, Oj. M. ℞ Sulph. lact., ʒ ijss.; spts. vini, ℥ jss.; spts. lavandulæ, ʒ iij; glycerin, ʒ ss., M., is recommended by Hebra. Besnier uses a paste composed of sulph., ℥ jss.; glycerin, ℥ j; spts. vini camphorat., ʒ x; aq. rosæ, q. s. M. et S. Apply overnight.

Ointments are also frequently preferred, and, of these, mention should be made of the ungt. hydrarg. ammoniat.; or the hypochloride of sulphur, ʒ j, in ungt. benzoat., ℥ j (Crocker); or an ointment of the iodide of sulphur, x to lx grains ad ℥ j; or one of beta-naphthol, five to ten per cent, or the ungt. hydrarg. oxid. rub. (U. S. P.), diluted one half or one third with ungt. simplicis or zinc oxide. When there is much infiltration and indolence, the ungt. hydrarg. nitratis, ʒ j – ʒ iij ad ℥ j is advised. The writer has never obtained much benefit from ointments, and would recommend their use only in cases in which there is a dryness of the skin, while lotions are particularly serviceable when the skin is greasy and oily, which is usually the rule. Besides the formulæ given, it should be stated that ichthyol, in cases in which there is much suppuration and inflammation, is especially valuable. It may be used in ointment, three to five per cent, or in aqueous solutions, three to ten per cent, or be added to some one of the lotions already mentioned. In the Bassorin paste of the writer it is also very useful. Beta-naphthol can be employed in the same manner, and both of these may frequently abort a beginning acne lesion. Tincture of iodine, pure carbolic acid, and chrysarobin are also mentioned among the remedies for acne, but can rarely if ever be needed.

ACNE ROSACEA. (George T. Elliot.)

Synonyms: Acne Erythematosa; Gutta Rosacea; Acne Rosée; Couperose; Kupferrose, etc.

Definition.—Acne rosacea is a combination of rosacea and acne. The former is a chronic congestive disturbance of the face, resulting in the production of permanent redness with dilatation of the blood-vessels, and, in some cases, more or less hypertrophy of the connective-tissue elements of the skin. The acne which develops is secondary, and due to inflammation of the sebaceous follicles.

Symptomatology.—Rosacea is located especially upon the nose and neighboring portions of the cheeks, but it frequently occupies the territory bounded laterally by the malar prominences, and extends to the forehead and chin. It may likewise cover the entire face with the exception of the orbital regions. The symptoms present most varying degrees of intensity, and in the course of the process three grades may be distinguished. In the first stage, a more or less marked congestion or hyperæmic condition of the nose and perhaps of other parts of the face comes on usually after meals, or after drinking hot fluids, or from exposure to cold, or at the time of menstruation. The flushing is sometimes accompanied by a sensation of heat, but more usually the skin is cold to the touch. The redness may only be transitory, and, remaining a little while, fades away entirely, to be renewed again later on. This course is continued for some length of time, when the redness returns at shorter intervals and irrespective of any apparent inducing cause, until finally it becomes permanent, suffering only from time to time exacerbations in degree. The congestive disturbance is then diffuse and ill-defined in outline, the circulation is sluggish, and the redness returns only slowly after pressure. Occasionally the hyperæmia is active.

The affected skin is frequently smooth and shiny, somewhat tense, the nose a little swollen, and a sensation of heat perceived. More often the surface is oily and greasy from a seborrhœa oleosa, the follicular orifices are somewhat dilated and contain small, yellowish plugs. It may also be somewhat scaly and itchy, or covered with thin yellowish crusts, if eczema seborrhoicum exists as a complication.

The process may remain in this stage for a long period of time, but sooner or later the second stage develops. It is characterized by the appearance—on the nose especially, but also on the cheeks—of fine, tortuous red lines, representing small dilated blood-vessels, which tend to form anastomoses and distinct telangiectases. Usually very narrow on the cheeks, on the nose they may be prominent, large, and become in their course more or less varicose. There is no limit to the number of these, but the entire surface of the nose and of the cheeks may be covered by these distinct, closely aggregated, fine vascular dilatations, and the skin becomes at times of a dusky or even violaceous tint. The skin may be dry and a little scaly, but more often the seborrhœa oleosa is increased in degree and the dilatation of the follicular orifices becomes extreme, giving the skin a sievelike appearance.

The process commonly remains in this condition, but in some cases, an increase in the connective tissue occurs and there develop tubercular-like growths on the sides and ends of the nose, which becomes bulbous and enlarged in all directions (rosacea hypertrophica). In exceptional cases the increase in size of the nose is enormous (rhinophyma), and it becomes as large as a small fist, lobulated or covered with nodules of all sizes. The follicular orifices are much dilated, the surface often very greasy, of a vinous, purplish red, and over it course distinct and often large varicose vessels.

The congestive disturbance having developed on the face, it may persist alone, but in the majority of cases acne lesions sooner or later appear, and it is to this combination of the two processes that the name of *acne rosacea* should be given. The follicular disease appears usually during the first and second stages of the rosacea, and, while no comedones may be seen, lesions of acne simplex, or indurata, or both, are distributed more or less abundantly over the nose and cheeks. They differ in no wise from those which originate independently of rosacea, being simply evidences of a folliculitis and perifolliculitis sebacea.

Pathology and Morbid Anatomy.—Rosacea is primarily a vasomotor neurosis, either from reflex or from local causes, and the repeated effects of the factors in operation lead to a somewhat paretic condition of the blood-vessels. In consequence, more or less marked dilatation of the vessels is produced, the congestive redness becomes permanently established, and, through implication of the superficial vessels and the sluggish circulation, the telangiectases and varicosities gradually become evident. Some of the varicose vessels, however, very probably originate through a blocking of their course by the formation of cicatrices in the cutis, caused by the suppuration and destruction of a sebaceous follicle. Whether new blood-vessels also form it is difficult to state. Secondarily, owing to the congestive disturbances, a seborrhœa oleosa develops, and the origin of acne lesions is favored by the debased nutrition of the affected surfaces. In certain cases a production of new connective tissue takes place about the blood-vessels, the skin becomes thickened, and ultimately either the hypertrophic form results, or the changes may be excessive and lead to rhinophyma. Leloir and Vidal attribute one form of the hypertrophic stage to an increase in size and a dilatation of the sebaceous follicles. The writer has examined the microscopic anatomy of the several stages, and in the first grade he found a dilatation of the blood-vessels in the cutis, and a few collections of round cells in the tissue here and there, but no structural changes in the glands. In the second stage there was an increase in the degree of these features, and many dilated vessels, with thin walls and large lumina, were generally distributed throughout the corium, which was slightly thickened and œdematous in places. In the third stage there was, in addition, an enormous hyperplasia of the connective-tissue elements of the cutis, and the sebaceous glands present in the sections were somewhat enlarged, but few in number. The vessels were large, the coats of some thickened. G. Simon, Piffard, and Rokitansky found substantially similar changes, but Hans Hebra states that the sebaceous glands in his sections were large and numerous, and the retained sebum contained in some of the acini cut off by the fibrous tissue, he thought, provoked irritation and further growth of the surrounding tissues. The pathology and morbid anatomy of the acne lesions do not need renewed description.

Etiology.—Rosacea, complicated or not with acne, occurs more frequently in women than in men. It develops most commonly after the age of thirty, though often between twenty and thirty, but also in younger as well as in older people. The most frequent causes of the congestive disturbance are disorders of the gastro-intestinal canal, either constipation, or gastric, or intestinal dyspepsia, fermentative processes, etc. Menstrual and uterine or ovarian disorders are also frequent causes, and at the monthly epoch the cutaneous disease is very apt to be aggravated. Sedentary habits and gouty conditions predispose to a great extent, owing to the functional disturbances usually caused by them. Circulatory disturbances, shown by a feeble pulse, cold hands and feet, etc., may also be mentioned. The morphine habit is stated by C. Q. Jackson to produce the disease, its cure being followed by disappearance of the skin manifestations. Processes of various kinds inside of the nose, atrophic and hypertrophic rhinitis, chronic catarrhal inflammations of various degrees, are among the local causes, and the writer would mention, in addition, sycosis of the vibrissæ, and, particularly in women, eczema seborrhoicum of the face. Exposure to cold and bad weather are factors, and the writer has seen a number of cases caused by severe sunburn, the redness remaining after the inflammation had subsided, the usual train of symptoms characterizing rosacea developing gradually. Face steaming and the use of very hot water, continual exposure of the face to the heat of a fire, may all be inducing causes. The effect of diet and abuse of spirituous liquors is very commonly observed. The articles of diet which are injurious are those which come under the head of "rich," and are apt to produce gastric and intestinal disorders. Though all liquors, whether used in excess or not, may lead to a rosacea, yet in the writer's experience it is especially fermented drinks, beer, ale, porter, and those which contain much sugar, such as sweet champagnes, liqueurs, port, etc. Tea may likewise produce the same effects when it is improperly made, as is the custom in certain classes, the tea being kept drawing all day, and water added when necessary. A more or less strong decoction of tannin is the result, and it is the injurious action of this astringent substance on the gastro-intestinal canal that leads to rosacea. The use of tobacco is also mentioned, but the influence of smoking is very remote, if any at all. In many cases no etiological causes for the existence of the disease will be discovered, but some writers believe that heredity plays an important *rôle.* Little can be said, however, in favor of this as an etiological factor.

Diagnosis.—The diagnosis of rosacea and acne rosacea will be made from the history of its development and the location of the chronic redness, which, preceded by intermittent flushing, finally became permanent, and was followed by the superficial vascular dilatation and the formation of telangiectases and varicosities. From an erythematous lupus it may be distinguished by the fact that the patches of the former are quite sharply defined, the edges somewhat elevated, they are scaly, have a tendency to peripheral growth, and very often leave more or less marked atrophic areas.

An erythematous eczema usually appears brusquely on any portion of the face, not necessarily on the nose and those regions favored by rosacea. The surface burns and itches, is somewhat swollen, and the natural lines of the skin are deepened; it is scaly, the squamæ are quite adherent, while to the touch the skin has much the slightly stiffened feeling that a thin coating of varnish or collodion would give.

It is hardly necessary to mention psoriasis or syphilis, though the latter, when localized on the nose in the form of superficial cutaneous gummata, often produces most peculiar appearances. Still, if due attention is given to the ulcerations that almost always can be found under the crusts, the character of the cicatrices, and the mode of extension of the lesions, error can be easily avoided.

Prognosis.—The prognosis can not be a positive one, but must depend upon whether the inducing cause can be removed and protection against its recurrence be obtained. In many cases an entire cure may be effected, or, if not this result, at any rate much relief may be afforded by persistent care.

Treatment.—The internal treatment will depend upon the indications existing in any given case—that is, appropriate medication should be made use of for the constipation, or gastro-intestinal, or uterine and ovarian disturbance, etc., which appear to be etiological factors. Gout, lithæmic or rheumatic states should be attended to by proper means, and every attempt be made to remove any and every disturbance of health. The diet should be regulated; sweets, pastries, cheese, and fermentable articles forbidden. Beer and alcohol in all forms should be stopped, but a light claret diluted with water may be allowed. In many cases, especially in those in whom there is a sluggish circulation, ichthyol will be found to be of great value in from five- to fifteen-grain doses several times daily. It is best to begin with five grains and to gradually increase the dose. It may be given in capsule or pill form. Arsenic is almost invariably injurious. Ergot and ergotin have been recommended, but are of doubtful value. Bulkley advises cod-liver oil for certain cases. Belladonna, digitalis, hamamelis, and quinia have all been used to meet certain indications, and enjoyed more or less individual reputation.

The local treatment is of the utmost importance. Any of the remedies or formulæ mentioned for acne vulgaris may be employed, but, except in acute cases, accompanied by much burning and active hyperæmia, more stimulating applications are necessary. When the former conditions prevail, soothing means are indicated, as the magnesia and zinc oxide, or the calamine and oxide of zinc lotion, or a bismuth lotion, or an ointment, as ℞ Salicyic acid, grs. x, ungt. aq. rosæ, ℥ j, M., or one containing oxide of zinc and calamine, etc.

When the acuteness of the symptoms has subsided, and also in the majority of cases, as the disease is usually chronic in type, more stimulating applications are called for. Unna recommends a strong resorcin or ichthyol (ten to twenty-five per cent) stiff paste, which is applied until extensive exfoliation of the epidermis is produced. A mild ointment is then used, and after the desquamation has ceased the strong application is renewed. The same steps are repeated until the redness has disappeared. Similar results are sought to be obtained by the use of caustic potash solutions (two to ten per cent), by vigorous rubbing with sapo viridis or spiritis saponis kalinus, the soap being allowed to remain on the surface so as to produce a decided reaction and stimulation. Vlemingkx's solution (℞ Calcis, ʒ iv; sulphuris sublimat, ℥ ij; aquæ, ℥ x. M. Boil down to ℥ vj) diluted in various proportions (one to two or to four or eight or even weaker), is often of value. Ichthyol is used by some in its pure state, but it is better to apply it in the strength of five to ten per cent. The disfiguration of an acne rosacea is generally sufficient, without the additional appearances produced by excessive treatment Therefore, ichthyol in aqueous solutions of five to ten per cent, or in the writer's Bassorin paste, will be found strong enough to produce the desired results. Resorcin is particularly indicated when seborrhoic eczema exists as a complication, and not only the acne rosacea should receive treatment under those conditions, but the scalp also, as it is then invariably affected. Resorcin may be added to any lotion being used, or it may be compounded in an ointment, or, for the face, in Bassorin paste. The strength of the application may be from five to twenty-five per cent, according to the effect desired. In high percentages, considerable inflammatory reaction may be produced and the horny layer of the skin may become greenish, or even bottle-green, in color. Care should, in consequence, be observed in its use. Chrysarobin has also been recommended, but it requires great care and is seldom necessary. Conjunctivitis and severe inflammatory reaction and pigmentation may be produced by it. Ergot is sometimes of value when locally applied. The fluid extract may be used either pure, or diluted with water or mixed with an ointment. Iodine dissolved in glycerin is advised by Kaposi. Painting the surface with collodion or traumaticine, etc., have also been recommended for the purpose of compressing the blood-vessels. They are not, however, of much value.

After the redness and congestion have been removed, the dilated blood-vessels remain, and their destruction may be attained by surgical means. Scarifications are most usually employed. A sharp-pointed bistoury or scalpel is suitable for the purpose. After the dilated vessel has been split longitudinally, it has been recommended to touch the wound with a sharp-pointed stick of nitrate of silver. The scarring often produced by this method is, however, objectionable. Iodine or pure carbolic acid may likewise be used, but better results in destroying the vessels are obtained from electrolysis (Hardaway), or from a thermocautery. For the former, the needle used for electrolysis of the hairs is suitable, and after penetrating the vessel the current of electricity is passed through it. The needle should represent the negative pole, while the positive pole, a wet sponge, should be grasped by the hand of the patient. The galvanic or faradic currents applied to the affected surface (Piffard and others), without penetration of the tissues with a needle, have been used with good effect.

The thermocautery gives excellent results. A fine needle-pointed cautery should be used, attached either to a Paquelin or other cautery. The micro-Paquelin of Unna is the most convenient instrument in the writer's experience.

For hypertrophic acne rosacea or rhinophyma, ablation of the excrescences and growths is necessary. They may be pared off with the knife or by other means preferred. Brocq states that he has tried, with apparent good effects, electrolytic destruction of each dilated sebaceous follicle. The needle is passed into the follicle and manipulated so as to reach all portions of the gland. A current of four to six milliampères is used by him. Under this treatment he has seen the affected parts diminish in size and become whiter, and he has obtained satisfactory results. The use of the actual cautery—thermo or electro—may also be recommended for certain cases.

ACNE VARIOLIFORMIS. (GEORGE T. ELLIOT.)

Synonyms: Acne Atrophica; Lupoid Acne; Acne Frontalis seu Necrotica; Acne Rodens; Acne Ulcerosa; Acne Pilaris, etc.

Definition.—A grouped papular and pustular eruption, characterized by a very slow evolution and a chronic course, and accompanied by a destruction of tissue, which causes a depressed cicatrix resembling that produced by a variola pustule.

Symptomatology.—Acne varioliformis is usually located on the forehead, along the margin of the hair, and also on the scalp and the neck. It is likewise seen on the face, on the chest, and cases are recorded in which it has been more or less universally distributed (Boeck, Pick, Bronson). It begins as deep-seated red papules, indolent in course, and showing a yellow point of suppuration, but more often their central portions become covered with a yellowish or brownish adherent crust, which conceals an ulceration, with sharply cut edges and an uneven base. The crust may enlarge, and after a variable length of time fall and leave a depressed dark-red cicatrix, which becomes pigmented and finally white. On the scalp, the hair is often seen piercing the lesion, which appears as a perifollicular infiltration. Pressure on some of the larger ones is followed at times by the apparition of a small drop of pus. Besnier and Doyon state that the lesions may be arranged linearly or in circles, or they may be abortive, confluent, or serpiginous. The course of the disease is very chronic, and it may last for many years. Crocker mentions cases he had seen, which, in an intermittent manner, had had a duration of ten and even thirty years.

Pathology and Morbid Anatomy.—The pathological origin of acne varioliformis is practically unknown. C. Boeck mentions having found a small streptococcus and staphylococci in the product of the disease, but does not commit himself as to their pathological significance. The examinations of the lesions with the microscope have shown that it was an inflammatory process with a tendency to produce tissue necrosis. Bazin was of the opinion that the lesion was seated in the sebaceous gland. Vidal and Leloir locate it around the sebaceous and hair follicles. Boeck concludes that it begins in and about the hair-follicles. Pick found no connection with either of these follicles, and Fordyce states that "the lesion begins as a deep-seated small cell infiltration about the coil glands, which are situated beneath the hair-follicles." Further investigations are certainly necessary before definite conclusions can be made.

Etiology.—The disease develops usually between the ages of thirty and fifty, and apparently occurs more frequently in men. What may be its cause is as yet unknown. Tilbury Fox and Crocker considered it to be of syphilitic origin, and state that a history or evidences of that disease is furnished by a certain number of patients. Bazin and Besnier mention the arthritic diathesis as an etiological factor in cases occurring in a diffuse form, while Vidal and Leloir observed it more often in those of lymphatic temperament. Besnier and Doyon advance as causes individual conditions, alimentary and other irritations, which lead to exacerbations and relapses. They also think favorably of there being some parasitic element of causation. The writer has had several cases in which the etiological factor appeared to be exposure to heat. They were in engineers, who stated that the head and face would become much heated when they were at work, and they were accustomed to frequently douche themselves with cold water.

Diagnosis.—Acne varioliformis, affecting as it does the scalp, can easily be differentiated from acne vulgaris, but it certainly resembles strongly a pustular syphilide. Still, the very slow evolution of the acne, and the fact that a papulo-pustular syphilide is usually more or less generalized, would aid in the diagnosis. Besides, adenitis, mucous patches, etc., usually accompany the syphilitic eruption.

On the scalp, acne varioliformis may be mistaken for the "folliculite decalvante" of Quinquaud; but this process is limited to regions covered by hair—the scalp, beard, axillæ, and the pubes. It causes irregular-shaped patches of alopecia having a cicatricial appearance, and the lesions are situated along their peripheries, and usually represented by miliary abscesses, the size of a pinhead or smaller, with a hair in the center of each.

According to Vidal and Leloir and others, Unna's ulerythema acneiforme belongs in the same category with varioliform acne. Unna would, however, differentiate it from that disease for the reasons that in the ulerythema there is no central tissue necrosis; no suppuration and ulceration; comedones form a prominent feature; the cicatrices do not resemble those of variola.

Prognosis.—The prognosis is favorable, but the disease is very rebellious to treatment, extremely persistent, and may recur continually.

Treatment.—Crocker advises iodide of potassium internally, and, if there is a syphilitic history, a mild mercurial course. Iron and cod-liver oil do well in certain cases. Kaposi recommends washing with an alcoholic solution of soap, mercurial plaster, and ungt. hydrargyri ammoniati. Brocq mentions steam douches, sulphur preparations locally; Crocker the ungt. hydrarg. nitratis diluted. The use of lotions containing mercuric chloride (1 to 500 or 1,000), boric acid, or ichthyol, will be found of decided value. The thermocautery or electrocautery may also be applied when the lesions resist all other forms of treatment, or they may be scraped with the curette. Besnier and Doyon recommend, as prophylactic measures against relapses, proper hygiene and diet, no wine or alcohol, alkaline beverages, and the regular use of soap or of weak mercurial lotions.

C. DISEASES OF THE HAIR-FOLLICLES.

CANITIES. (George Thomas Jackson.)

Synonyms: Trichonosis Cana, seu Discolor, seu Poliosis; Poliothrix Poliosis; Trichosis Poliosis; Spilosis Poliosis; Poliotes; Whiteness of the Hair; Blanching of the Hair; Atrophy of the Hair Pigment; Grayness.

Grayness of the hair may be congenital or acquired, general or partial, idiopathic or symptomatic, and may come on slowly or suddenly.

Congenital Canities.—This is a rare condition, and most commonly occurs in the form of tufts of gray or white hair that show prominently against the surrounding normally colored hair. These white tufts are hereditary in some families. Godlee (Medical Times and Gaz., 1884, i, 180) reports one such instance in a girl whose mother, two maternal aunts, a maternal uncle, grandfather, and great-grandfather all had the same family mark, and it appeared in all the children of the mother's sister. Morgan (Brit. Med. Jour., 1890, ii, 85) reports another case occurring in four generations.

When congenital canities is general it is but a part of that condition known as albinism, in which there is an absence of pigment from all the tissues.

Acquired Canities is a very common condition. It occurs either early or late in life, but usually not before the thirty-fifth or fortieth year. Cases occurring before that age are spoken of as premature. The hair over the temples is usually the first to turn gray, but the process of apigmentation having begun it is in most cases continuous, it being simply a question of time when all the hair of the head will become white. The rapidity varies greatly, the progress sometimes being very slow. As a rule the hair of the beard is not affected until long after that of the scalp, though it may first be affected. Later still does grayness affect the body hair, which would seem to show that the later the time of first appearance of the hair the greater is its power of resistance to this form of atrophy.

The change in color is permanent in the vast majority of cases, though instances of permanent restoration of color have been reported. Such cases are nearly as exceptional as are those of a new growth of hair on a bald head, or a third set of teeth. Of course, this does not refer to those cases of alopecia areata in which the first growth of white hair is replaced by normally pigmented hair. A case of relapsing canities extending over thirty years has been reported to me by an old physician of this city who vouches for its accuracy. In this case the color changed from black to white and back again three times.

Apart from the change in color, the hair is apparently normal, as is the scalp. In vitiligo we have tufts of gray hair upon apigmented patches of scalp. In cases occurring late in life baldness is apt to follow the graying of the hair in from one to five years.

While canities is usually a gradual process, a number of instances of sudden blanching of the hair have been reported. Some authorities question the correctness of the observations, but to me they do not seem to admit of doubt. Such cases occur under the influence of profound mental shock. Not to go back to the tales of ancient history by lay writers, I would instance two modern cases reported by reputable physicians, viz.: Landois (Virchow's Archiv, 1866, xxxv, 575) in 1866 had a case of blanching of the hair during one night. The patient was suffering with delirium tremens. Raymond (Rev. de Méd., 1882, ii, 770) in 1882 reported the case of a nervous woman whose hair changed color from red to white during a single night and following the receipt of the news of the loss of a large sum of money on the stock exchange. There was in this case intense neuralgia, and after the hair changed color, it fell out.

The white hair seen in vitiligo or leucoderma, and the first growth after loss of hair in alopecia areata, syphilis, and other forms of baldness, may be regarded as symptomatic canities. Here, too, might be placed those cases occurring in the course of nerves affected by neuralgia.

Etiology.—Heredity plays a very important *rôle* in the etiology of premature canities, early graying of the hair being a marked characteristic of some families. Mental or nervous strain, especially if combined with worry and anxiety, is another active factor. It has been observed to follow local diseases or injuries of the scalp, such as wounds and repeated epilation. We have already instanced alopecia areata and other forms of baldness being followed by canities, as well as albinism. Dissipation, by its damaging effects on the *morale* of the individual, will also predispose to canities, as will any exhausting disease. Prolonged residence either in a very hot or very cold climate has been known to induce grayness, especially if combined with much exposure to the weather. Advancing age is the cause of canities occurring after middle life, the change of color being but a part of the phenomena of senility.

Pathology.—The hair turns gray first at its root, and the loss of color is due to some unknown change in the hair papillæ, which interferes with the normal pigmentation. We have very little actual knowledge of the way in which pigment is produced, even in the skin, and still less in regard to the hair. Pincus (Virchow's Archiv, 1869, xlv, 129) has shown that in the beginning of canities the pigment slowly leaves the middle layers of the papilla, while in more advanced cases the external layers alone produce or contain pigment. Besides the absolute loss of pigment in the hair there is more or less air in its cortical layer, and this still further contributes to the whiteness of the hair. It is the presence of the air in the cortex that gives the gray look to those hairs that are apparently turning gray first at their distal ends. The entrance of air into the cortex is the only explanation tenable of the instances of sudden blanching of the hair. We know that pigment can not suddenly change its color, and we are compelled to fall back upon some trophoneurosis permitting the formation of air-bubbles within the hair, or so altering its texture as to allow of entrance of the air from without. If these hairs are put under an air pump and the air is exhausted they will resume their normal color. This shows that the pigment color has been obscured by the air.

Treatment.—Nothing can be done to restore the color to the hair except to use hair dyes, all of which are more or less objectionable. In cases coming from some evident cause, such as a neuralgic or debilitating disease, it is possible that the color may return with returning health, though the chances are against it. The hair has been known to grow darker under the continued use of pilocarpine. Besnier suggests the local use of acetic acid as a promoter of pigmentation. For dyeing the hair black the following is recommended by Leonard as safe:

No. 1.

℞ Bismuthi citratis		℥ j (30 grm.)
Aquæ rosæ,		
Aquæ destillat.	āā	℥ ij (60 grm.)
Alcoholis		ʒ v (20 grm.)
Ammoniæ		q. s.

M. Sig.: Apply in the morning.

No. 2.

℞ Sodii hyposulphit.	ʒ xij (48 grm.)
Aquæ destillat.	℥ iv (140 grm.)

M. Sig.: Apply thoroughly in the evening.

For a brown dye Pfaff recommends this pomade:

℞ Ol. ovorum rec. press.,	
Med. oss. bovis	āā 50 grm.
Ferri lactat.	2·50 grm.
Ol. cassiæ ether.	1·50 grm.

M.

There are also a number of dyes containing nitrate of silver or bichloride of mercury, which are not safe.

Ringed Hair.—In this very rare condition, which may be placed under the caption of canities, the hair, instead of being uniformly gray, presents alternate white and pigmented spaces, giving it the appearance of being ringed, and hence its name. Wilson (Trans. Roy. Soc., Lond., 1867) was, I believe, the first to report such a case, and but few have since been reported. In his case the disorder was first noted when the boy was between two and three years old, and was progressive. Apart from the peculiar distribution of the pigment the hair was apparently normal, its shaft being uniform. The brown or normal segments measured one fiftieth of an inch in length, and the white segments were about one half as long. The uniformity of the hair distinguishes the disease from trichorrhexis nodosa, in which the hair is sometimes marked with alternate light and dark streaks, but they at the same time present nodular or fusiform swellings with contractions between.

The cause of this curious phenomenon is not determined. Wilson thought that it was due to the development of a gaseous fluid within the hair, and supposed that the different segments were the products of different days; or that the white, opaque segments, containing the air-bubbles, grew during the night, and the normally colored segments grew during the day. It is more probable that the appearances are due to some obscure and intermittent interference with the pigment formation in the hair papilla.

DISCOLORATION OF THE HAIR. (George Thomas Jackson.)

Synonyms: Tricolorosi; Trichonosis seu Trichosis Decolor.

Under this heading are placed those changes in color of the hair other than turning gray. They are mostly of little practical consequence, and many of them are instances of the action of chemical substances upon the hair.

Cases have been reported in which the hair has fallen out after some serious illness, and when it grew in again it was of a different color. Reinhard (Virchow's Archiv, 1884, xcv, 337) reports a case of periodic change in the color of the hair of an idiot boy coming on after violent outbursts of temper to which he was subject. The change was from a reddish blonde to a blonde yellow, and was probably due to the entrance of air into the cuticle of the hair.

Prentiss (Med. Times, Philadelphia, 1881, xi, 609) reports a case in which the color of the hair changed from a light blonde to an almost pure black under the continuous hypodermatic administration of the muriate of pilocarpine for six months. With the change of the color the hair grew coarser.

Green hair has been met with in workers in copper. Bieli (Giorn. Ital. d. mal. d. Pelle, 1872, xiii, 243) reports a case of the hair turning green under the use of a wash of corrosive sublimate and an ointment of yellow oxide of mercury used in the treatment of trichophytosis capitis. It is quite common to see the hair assume a greenish-yellow color in changing from its normal color to white.

Blue hair occurs in workers in cobalt mines and indigo works. The color can be readily removed by washing, particles of indigo being deposited on the hair.

Yellow hair has been observed in cases of icterus. *Coal-black* hair is seen in those who work in coal.

That chemicals will change the color of the hair is shown by the arts of the hair dyer and bleacher, and by the discoloration caused by chrysarobin. Bicarbonate of soda, used for a long time, will change dark hair to a dirty red brown.

HYPERTRICHOSIS. (George Thomas Jackson.)

Synonyms: Hypertrophia Pilorum; Hirsuties; Trichauxis; Polytrichia; Dasyma; Trichosis Hirsuties; Poils Accidentels (Fr.); Superfluous Hair.

Definition.—Hypertrichosis is a growth of hair either abnormal in amount or occurring in places where normally only lanugo hairs are found, or at a time when the hair of puberty is not usually seen.

Symptoms.—Hypertrichosis may be congenital or acquired, general or partial. Cases of the general form are called hypertrichosis universalis, while those of the partial form are named hypertrichosis partialis.

Hypertrichosis Universalis is also congenital. Though these cases are spoken of as universal, they in reality are not so, the palms of the hands, the soles of the feet, the backs of the last phalanges of the fingers and toes, the inside of the labia majora, the prepuce, glans penis, and upper and lower eyelids being free. These are locations in which hair never grows. The hair grows continually coarser and darker until it reaches its full development. Even then, though nearly the whole body is covered with hair, there is a difference in the texture of the hair in different regions, it being most coarse in the beard. The hair grows in definite streams downward and away from the middle line, both anteriorly and posteriorly.

Subjects of this form of hypertrichosis are called *homines pilosi.* There is usually a marked deficiency in the growth of the teeth in them. Cases of this sort are met with in different parts of the world.

Partial Congenital Hypertrichosis is far more common than is the universal form. Many of these cases are really hairy nævi. In true hypertrichosis the underlying skin is normal in color and texture, and the hair is fine and soft. One of the most frequently affected regions in this variety of hypertrichosis is that of the sacrum, or over the lower lumbar vertebræ, where it is commonly associated with a past or present spina bifida. The frontal region is another frequent site of the abnormality, though in many cases the hair is shed from the forehead as the child grows older.

Acquired Hypertrichosis is always partial. Though we speak of such cases as acquired, there is in the vast majority of them an inborn tendency to the growth. It may take the form either of an excessive growth of hair in regions where it is normally found; or of the development of hair in regions usually spoken of as hairless, though in reality furnished with lanugo hair; or of an unusually early appearance of pubertal hair (*heterochronie*); or of an abnormal development of pubertal hair according to sex (*heterogenie*). Many cases of all these varieties have been and are constantly met with. Excessive growth of hair over the sternum and on the shoulders is not uncommon. Men have lived with beards reaching to the ground, and women with hair that trailed on the ground as they walked. As instances of heterochronie may be mentioned the boy eight years of age with the whiskers of a man, reported by Chowne (Lancet, 1852, i, 421), and the six-year-old girl with pudenda like a twenty-year-old woman, reported by Beigel (Virchow's Archiv, 1868, xliv, 418).

Heterogenic Hypertrichosis is but another name for that form of hypertrichosis that most frequently demands treatment at our hands—that is, the growth of the beard in women. These are also the most frequent instances of our second variety. There are three distinct varieties of facial hirsuties in women:

1. *The development of hair upon the face at about the time of puberty,* or when the beard normally appears in boys. In these cases the hair appears on all parts occupied by the beard in men, though it is usually most pronounced upon the chin. If these cases are injudiciously treated, and very often even if left to themselves, the hair will develop into a luxuriant beard. Happily in very many cases, if the hair is not cut or pulled, or resort had to so-called depilatories, the hair will not develop into a coarse and vigorous growth. It is impossible to tell what the outcome of these

cases will be. Sometimes the unfortunate bearer of the beard will brood over her deformity, shun society, and become melancholic. A well-marked acne is a frequent complication of this form of hypertrichosis. In some cases there will be a development of coarse hair on the chest.

2. *The development of hair upon the face in the years bordering on or following the climacteric.*—In such cases the growth is usually scanty, and consists in a greater or less number of coarse hairs disseminated over the chin and upper lip. It is only exceptionally that the hair is abundant enough to form a luxuriant beard.

3. *Transitory hypertrichosis.*—In these rare cases there will occur a growth of hair upon the face during pregnancy, to disappear some months after parturition ; or a growth will occur in a young woman with delayed menstruation, to disappear with the establishment of the function ; or it will disappear after marriage and conception. A very peculiar case was reported by Gottheil (Trans. Internat. Med. Cong. IX, 1887, iv, 181) of a Jewess who, after having had several children, suffered a prolonged amenorrhœa, during which a most coarse and stubborn growth of hair appeared on the face. Both Dr. Gottheil and myself treated this woman by electrolysis for the removal of the beard during several years. She then became pregnant, gave birth to a child, and nearly all the hair remaining upon her face disappeared.

Cases of transitory hypertrichosis have been reported in both sexes following the treatment of a fractured limb, the growth of hair being most pronounced on the injured limb. Injury to nerves has been followed by hypertrophy of hair, which disappeared after the injury has been recovered from. Hair has also grown on parts subject to continued irritation, as by a blister, and fallen out again.

Etiology.—Heredity as a cause of hypertrichosis is well marked in the universal congenital form. Of course, heredity does not explain the first occurrence of the trouble, nor does any of the theories advanced, such as atavism, nervous influence, maternal impressions, fecundation of the human female by a hairy animal, and the like.

Local irritation, as by exposure to sun and wind, the application of poultices, or heat and moisture in any form, the use of pilocarpine—any of these may cause an acquired hypertrichosis on account of determining an extra supply of blood to the part.

As to the causes of hirsuties in women, there is no doubt that in a great majority of the cases occurring in young women heredity is the chief cause. In most of these cases we will find that either the mother or some female relative of a preceding generation has or has had a similar growth. In some nationalities hirsuties is more common than in others—another support for the theory of hereditary influence. Even in hirsuties appearing late in life there is frequent evidence of hereditary influence.

That there is some relationship between the hirsuties and the organs of reproduction is shown by the cases of hirsuties appearing at the climacteric and those instances of transitory growth of hair already cited. We are ignorant of the true connection between the apparent cause and effect. In some cases there is a decided masculinity of voice and manner, though in my experience the beard has been the only masculine feature in the great majority of the cases. Cutting, pulling, and shaving the hair, as well as using depilatories, make the hair coarser.

Hamilton (The Medical Record, 1881, xix, 281) has made an interesting study of the relation between hirsuties and insanity in women. He believes it to be of neuropathic origin, connected with disorder of the fifth cranial nerve, and that, when it occurs upon the face of an insane person, it is indicative of an unfavorable form of insanity, especially if the subject has not reached middle life.

Treatment.—The treatment of hypertrichosis is simple and efficacious, though laborious and tedious. For general hypertrichosis we can practically do nothing—this, not because we can not destroy hair so that it will not grow again, but because of the great amount of time it would take to destroy it.

The form of hirsuties that most urgently calls for relief is that occurring on the face in women. In 1875, Dr. Michel, of St. Louis, devised the method of removing the hairs in trichiasis by means of electrolysis, and Dr. Hardaway, of the same city, adapted it to the destruction of superfluous hair.

The instruments needed for the operation are a good twenty cell zinc-carbon (galvanic) battery, a sponge electrode, a proper needle-holder, a fine needle, a pair of epilating forceps, and, if the operator's eyes are not good, a lens of low power. Any sponge electrode will answer. There are various patterns of needle-holders, any one of which may be used. I prefer one which is not longer than three or three and a quarter inches, with a diameter of about three sixteenths of an inch. It should be long enough to be held with ease, and not too long to be readily manipulated. If the woman has a large bust, a high chest, and a short neck, a short holder will be found a great convenience when working under the chin. The most essential instrument is the needle, and for the best success this must be carefully chosen. Dr. Hardaway, in the April number of the Journal of Cutaneous and Venereal Diseases for 1885, speaks of a needle which he uses made of iridium and platinum. He claims that it will follow the direction of the hair-follicle, and more surely hit the papilla than will a steel needle. I have had most satisfactory results with a jeweler's instrument called a "steel broach." These may be had of any dealer in jewelers' supplies. Nos. 5 and 7 are serviceable sizes. Care should be used in selecting them, as they are so fine that their points are sometimes broken while in the packages. A lens is generally not needed. Dr. Piffard has invented a needle-holder with lens attachment, which he has found useful.

A good light is necessary for the operation, and a cloudy day is a bad one for working. An operating or reclining chair is a comfort, and the patient should be so placed that the part to be operated on is on a level with the operator's eye. The operation is done in the following manner: The patient, being in position, is to be given the sponge electrode attached to the positive pole of the battery, and told to hold it in one hand. The hair to be extracted is then seized with the forceps, and put slightly on the stretch *in the direction in which it naturally grows.* The needle, attached to the *negative pole* and held like a penholder, is then inserted parallel with the hair and into the follicle. If the follicle is properly entered, the needle glides smoothly along. The needle should be thrust to a depth of about one to three sixteenths of an inch, according to the size of the hair. The coarse hairs have, as a rule, their papillæ deeper down in the skin than do the finer hairs. After the insertion of the needle the current is closed by the patient placing the palm over the sponge electrode. In a few seconds there will be a little frothing about the needle, and in from half a minute to a minute the hair will come away upon the very slightest traction.

The hairs in close proximity should not be extracted, because an undue amount of inflammatory reaction might be set up that would lead to deep scarring. It is best not to remove the lanugo hairs. The strength of the current to be used will depend upon the quality of the patient's skin, and somewhat upon her powers of endurance. From eight to sixteen cells, or from one half to one and a half milliampères, may be given as the extremes of current strength.

The immediate effect of the operation is the production of a number of wheals. On the next day only red points are seen, and in a few days all irritative effects of the operation have disappeared. Usually small punctiform scars, barely noticeable, are caused; exceptionally the scars may be larger and deforming.

The amount of pain experienced by the patient will vary greatly. Some women will complain bitterly of a current of half the strength that other women will bear with ease. Certain parts of the face are far more sensitive than others. The most sensitive points, I have found, are over the ridge of the lower jaw on each side of the chin, and about the upper lip. On the whole, the pain does not amount to much. After a time the skin seems to become tolerant of the action of the current and the patient no longer complains. Hyperpigmentation may be produced by the operation. This is a very rare complication. I have seen it in only one case, a hypochondriacal woman; and here, instead of the redness which is always produced about the point of puncture, fading away in a few days, it gave place to a dark-brown stain which remained for a number of months.

The use of *depilatories* is to be deprecated. None can be depended on for the permanent destruction of hair. Sometimes they are useful, as when the growth consists of some coarse and many fine hairs. A depilatory will sweep all the hairs away; the coarser ones will first appear, and can be operated on by electrolysis before the finer ones grow long enough to be in the way. As depilatories may be used, this one as recommended by Anderson:

℞	Sulphate of barium	ʒ jss (6 grm.)	
	Oxide of zinc	ʒ vj (24 grm.)	
	Carmine	gr. j (.06 grm.).	M.

Some of the powder is to be made into a paste with water, applied to the part and washed off in three minutes.

Duhring gives this powder:

℞	Sulphide of sodium	ʒ ij (8 grm.)	
	Prepared chalk	ʒ vj (24 grm.).	M.

This likewise is made into a paste with water, spread on in thin layer, and washed off as soon as it causes heat of the skin, or in ten or fifteen minutes, and the part anointed with a bland ointment.

Hair has also been destroyed permanently by means of breaking up the papilla by rotating a three-cornered surgical or glover's needle within the follicle. No method thus far devised equals that by electrolysis.

Prognosis.—The prognosis as to the success of the operation by electrolysis is good, there being no doubt that hair can be permanently removed in that way. A certain proportion, say from twenty to fifty per cent, will return after each series of sittings, because it is impossible to surely strike the papilla every time. The more skillful the operator the smaller will be the percentage of returns. It will be necessary to go over the face a second or third time before all the hairs are destroyed. In young women in whom there is a strong tendency to the production of hair, new hairs will develop for years. It is in elderly women with a few straggling coarse hairs that we meet with the most brilliant success.

ATROPHIA PILORUM PROPRIA. (George Thomas Jackson.)

This term is applied to two diseases of the hair, namely: fragilitas crinium, and trichorrhexis nodosa. Of course, alopecia is also a form of atrophy of the hair, but it is usually not included under our present caption. Both forms of atrophy of the hair are distinguished by splitting and breaking of the shaft either spontaneously or on slightest traction.

FRAGILITAS CRINIUM. (George Thomas Jackson.)

Synonyms: Scissura Pilorum; Trichoptilosis; Trichoxerosis; Splitting of the Hair.

The hair in fragilitas crinium is more or less dry, and its shaft is split either at the end or in its continuity. The disease may be either symptomatic or idiopathic, and it may affect the hair of any part of the body, though it is most commonly encountered in the scalp hair.

The *symptomatic form* is met with in connection with very many diseases of the scalp, such as trichophytosis, favus, seborrhœa sicca, and eczema.

In the *idiopathic form* there is no apparent disease of the scalp, but the hair becomes more or less dry and split. In many of these cases the patients are in a condition of evident ill health, either convalescing from some fever, or laboring under some cachexia such as phthisis, or what is commonly called the strumous diathesis. In many cases, however, there is no apparent departure from health.

In both the symptomatic and idiopathic forms the cleft of the hair may be either at its free extremity, in the continuity of the shaft, or even within the bulb. The free end is the part most often affected, and the cleft may run a long way up the shaft. Beginning at the proximal end, the hair is often split for a great part of its length, and the filaments of hair may hold together or separate widely. When it is the end of the hair that is split the filaments are very prone to separate and curl up on themselves. The diseased hairs are scattered through the scalp hair or beard, not every hair being affected, although in some cases but few escape. As air enters between the filaments it gives the broken ends a gray look, and if a great many hairs are diseased the hair-mass will look dusty. The long hair of the scalp in women is in a great majority of cases the seat of the disease. Not infrequently besides the splitting of the hair we meet with that condition known as trichorrhexis nodosa.

Pathology.—Apart from the splitting of the hair there may be no abnormality excepting a little irregularity in the contour of the shaft. The hair-bulb may be normal or atrophied. Duhring (Amer. Jour. Med. Sciences, July, 1878) has reported one case in which the hair-bulbs were atrophied and the fissure of the shaft began within the bulb. The medulla was present only here and there in broken spaces.

Etiology.—In symptomatic fragilitas crinium when of parasitic origin we can understand readily that the presence of the parasite in the hair-shaft will cause it to split. In the cases arising from other local or general diseases the hair splits because its nutrition is interfered with, either directly on account of disease of the skin, or indirectly as sympathizing with a general lowering of nutrition.

The cause of the idiopathic form is probably the same as of the symptomatic—an interference with nutrition. Kaposi thinks that the long scalp hair of women splits on account of the distance of the end of the hair from the papilla.

Treatment.—Treatment should be directed to the condition of the scalp or skin and to the general health of the patient. We can not expect to effect a cure of even an apparently idiopathic case as long as the patient is out of health. The hair should be cut off just above the split. If it affect the beard, it should be kept short, and the patient cautioned against handling it roughly. As a last remedy we may have to resort to shaving.

TRICHORRHEXIS NODOSA. (GEORGE THOMAS JACKSON.)

Synonyms: Trichoclasia; Trichoptylose; Tinea Nodosa; Clastothrix; Tricho-Syphilis; Aplasie Moniliforme.

Trichorrhexis nodosa is the name applied to a rare and peculiar disease of the hair in which nodes appear along its shaft, and fracture readily takes place through them. This condition develops without antecedent symptoms, and affects most frequently the beard. The scalp is less often diseased in this way. Raymond (Ann. Derm. et Syph., 1891, ii, 568) reports having met with the disease on the labia majora in forty per cent of all the women he has examined, especially in fat women. He has seen the scrotal hairs affected in the same way.

The hair feels knotty, and we find that along its shaft there are one to five whitish, grayish, or blackish, shiny, transparent nodular swellings looking not unlike the nits of pediculi. But they are oval and involve the whole circumference of the hair. The size of the nodes will vary with the diameter of the hair, being larger in coarse than in fine hair. They are located, usually, nearer the proximal than the distal end of the hair. The hair is very brittle and breaks easily, the fracture most often taking place through a node, though sometimes it is through the internodular space. The fracture is usually transverse, but it may be longitudinal. The fracture may be complete or incomplete. If complete and through a node, the hair will end in a swelling with fibrillar outrunners looking like a paint-brush. If incomplete, then the appearance will be like that presented by pushing two paint-brushes together end to end. Sometimes the hair has an irregular contour and is frayed throughout its length. The hairs themselves are firmly fixed in their follicles. If a great many hairs are affected, the beard will present a singed appearance.

A somewhat similar condition of the hair has been reported by Hallopeau and Lefèvre (Bul. de la Soc. Franc. de Dermatol. et Syph., 1890, i, 78 and 111), under the name of *aplasie moniliforme.* The case reported by them occurred in a child whose scalp was covered with a number of little prominences capped with scales and corresponding to the follicular openings. A few hairs were healthy; the rest were short and broken off close to the scalp. The longer ones broke on slight traction, and presented a series of perfectly fusiform swellings, separated by thin segments of lighter color than the nodes.

Etiology.—The cause of the disease is still undetermined. It seems to be allied to fragilitas crinium, and it is probably a nutritive disturbance due to a trophoneurosis. Wolfberg (Deutsche med. Wochenschrift, 1884, x, 490) regards it as probable that when it occurs in the beard it is due to repeated mishandling of the thick hair, as by violent rubbing, or constant pulling. There seems to be a hereditary tendency to the disease in some cases. Anderson (Lancet, 1883, ii, 140) saw a case in which the disease could be traced back to the great-grandmother. Hallopeau and Lefèvre's case, already quoted, was hereditary. Steven (Glasgow Med. Jour., 1889, xxxi, 459) reports a case of heredity traceable back to the grandfather at least. In these cases the disease is apt to show itself shortly after birth. Recently a micro-organism has been described as the cause of the disease.

Pathology.—In the early stage of the disease there is simply a spindle-formed thickening in the continuity of the shaft, and a corresponding swelling of the medulla, the cuticle being intact. Then a transverse fracture of the nodular swelling occurs, the hair splits up into fibrillæ, and if the hair is broken we have the already mentioned brushlike appearance produced. As soon as the fracture or cleavage occurs the medulla undergoes degenerative changes and slowly disappears. The hair roots may be unchanged or they may be slightly atrophied. Giovannini (Vrtljhr. Derm. u, Syph., 1887, xiv, 1049) has found that almost all the diseased hairs have a markedly triangular contour with sharp angles, and depressed surfaces between them.

Diagnosis.—Trichorrhexis nodosa must be diagnosed from tinea nodosa, piedra, and trichomycosis nodosa or Paxton's disease. It differs from *tinea nodosa* in not being parasitic, and in presenting multiform fusiform swellings of the hair-shaft with healthy spaces between them. In tinea nodosa we have an incrustation of the hair composed of granular material that forms the nodes. It differs from *piedra* in the fragility of the hair, and in the absence of hard, strong, white masses composed of fungi about the hair-shaft. It differs from *Paxton's disease* in affecting principally the beard and not the axillary hair, in its nodes involving the whole contour of the hair and not being placed to one side of it, and in the characters of the parasite.

Treatment.—The treatment of the disease is very unsatisfactory. Shaving for a long time, in the hope that after a while the hair will recover its normal condition, is most to be relied on. Various stimulating remedies, such as sulphur and the mercurials, may be tried. Gamberini recommends bathing the part with the following lotion:

℞	Potass. subcarb.	ʒ iij (12 grm.)	
	Alcohol dil.	℥ v (100 grm.).	M.

Or using innunctions of tannic acid or oil of cade. Schwimmer (Vrtljhr. Dermat. u. Syph., 1878, v, 585) advises that an ointment of

℞	Zinci oxid.	gr. vij (0·5 grm.)	
	Sulphur. loti	gr. xv (1 grm.)	
	Ungt. simpl.	ʒ ijss. (10 grm.).	M.

be rubbed in morning and evening. Besnier finds it useful to pluck the diseased hairs and to apply tincture of cantharides pure or diluted to the newly formed ones. Wolfberg recommends simply leaving the hair alone and forbearing from rubbing it.

TRICHIASIS AND DISTICHIASIS. (George Thomas Jackson.)

By *trichiasis* is meant a congenital or acquired displacement of the eyelashes so that they are directed backward and scratch the eyeball. Besides being misdirected, the cilia are often twisted or distorted. After this condition has lasted some time lanugo hairs develop from all parts of the tarsal margin and even from the mucous membrane of the lids. These are also directed backward. Both the upper and lower lid may be affected of one or both eyes. The disease is generally an acquired one, following some long-continued inflammatory disease of the eyelids, such as granular or purulent ophthalmia.

Distichiasis differs from trichiasis in having a double row of cilia, the inner one alone being turned backward and scraping the cornea, and in not having a development of lanugo hairs. Very often the offending hairs can not be seen until the lids are everted. It is most often a congenital defect, symmetrical, bilateral, and affects the outer third of the upper lid. It may be acquired from the same causes that induce trichiasis.

Both diseases cause irritation of the cornea, opacity of the same, pannus, and ulceration.

Treatment.—The palliative treatment is by epilation, which of course gives but temporary relief. Various operations upon the lids have been devised from time to time. With these we are not now concerned. Electrolysis, as proposed by Michel (St. Louis Clin. Rec., 1875, ii, 145) is the best means for destroying the refractory hairs. The operation is performed as in the treatment of facial hirsuties. Michel prefers to use a No. 8 cambric needle rather than a finer one, because its action is less limited.

PLICA POLONICA. (George Thomas Jackson.)

Synonyms: Trichosis Plica; Trichoma; Kaltun (Polish); Weichselzopf (Ger.); Plique Polonaise (French); Polish Ringworm (Eng.).

Plica polonica is a condition of the hair induced by lack of cleanliness, in which the hair becomes matted together in various-shaped masses. Upon these extraneous matter is deposited, such as dust and feathers, and if the mass is lifted up from the head the scalp will be found in an inflamed condition in many cases, and very frequently harboring immense hordes of lice. In other cases the plica lies quite close to the scalp. In some cases the matted mass will be at some distance from the scalp, and the latter will be found to be in a healthy condition. This indicates that the disease of the scalp that gave rise to the plica has been recovered from, and the growing hair has pushed the mass away from the scalp. The scalp remaining healthy, the plica will eventually fall off by the breaking of the hair that connected it with the head. While the hair of the scalp is that most often affected, the long hair of any part of the body may exhibit these masses. The odor given out by these plicas is strong and disgusting. The only subjective symptom is the itching. The patient may be in a most robust condition or in poor health.

Various names were applied in old times to the different-shaped plicas, and they were regarded, and still are so, by the Polish and Russian ignorant people with superstition. They believe that a plica prevents other sickness, and if one who is ill can but raise a plica he will recover.

Etiology.—Want of care of the hair, combined with an inflamed condition of the scalp, and in most cases with pediculosis, such is the state of things that produces a plica. The condition is endemic in certain parts of Poland, especially in the low-lying provinces, where the inhabitants know little about hygiene. It is met with now and again in this country among immigrants from Russia and Poland. Both men and women have them. Mild grades of the affection are occasionally seen among our own people, arising from the same causes.

Treatment.—The mass, if of large size, had best be cut off entire. If this is not permitted, on account of superstition, or if the plica is small, it can be removed by soaking the hair with oil, washing out with soap and water, and subsequent careful brushing and combing. Patience and perseverance are necessary in these procedures. While working at the removal of the plica, we must not neglect to treat any disease of the scalp that is the underlying cause.

Under the name of *neuropathic* or *nervous plica* cases of peculiar felting of the hair have been reported from time to time. The true etiology of these cases is not understood. It is assumed that they are due to nervous influences.

PIEDRA. (George Thomas Jackson.)

This is a disease of the hair that occurs in the United States of Colombia, and consists in the growth along the hair-shaft of a series of small, hard, dark-colored and gritty nodes, that rattle like little stones when the hair is combed or shaken. The nodes occur at irregular intervals along the hair-shaft and completely invest it. The first node is located at about half an inch from the point of exit of the hair. Women are far more often affected than men. The disease is noncontagious. When well developed a case bears some resemblance to a head infested with pediculi. The hair of the head alone is affected, and is said to have an acid odor.

Pathology.—The affected hairs are weak, and look like lanugo hairs. The nodes are hard to cut, and appear under the microscope as honeycomb masses, consisting of mycelia and spores and zoöglœa bodies of rod-like filaments. The surface of the nodes is deeply pigmented.

Etiology.—The disease is evidently a fungous growth. By some it is thought to be due to the use by the native women of a mucilaginous oil as a hair-dressing. Others regard the use of the sticky water of certain streams as a cause. Heat seems to be requisite for the growth of the fungus, the disease occurring most often in warm valleys.

Diagnosis.—It differs from trichorrhexis nodosa in the stony hardness of the nodes, in the hair not breaking, in its etiology, and in its evident fungous origin.

Treatment.—Hot water will entirely remove the nodes.

ALOPECIA. (George Thomas Jackson.)

Synonyms: Athrix depilis; Atrichia; Calvities; Capillorum Defluvium; Depilatio; Defluvium, seu Lapsus, seu Fluxus Pilorum; Lipsotrichia; Ophiasis; Phalacrotes; Trichorrhœa; Calvitie (Fr.); Kahlheit (Ger.); Calvezza (Ital.); Baldness, Loss of Hair.

Definition.—An abnormal loss of hair arising from whatever cause, that may be general or partial, and which, though usually affecting the scalp, may occur upon any hairy part of the body.

Symptoms.—It would be well to make a distinction between the process of hair-fall and the accomplished result of baldness. The former should be called *alopecia* and the latter *calvities*. There are four main varieties of alopecia, namely: (1) Alopecia adnata; (2) alopecia senilis; (3) alopecia presenilis or prematura; and (4) alopecia areata. The last of these is most ably treated in this system by my distinguished colleague, Dr. A. R. Robinson.

Alopecia Adnata.—This rare form of alopecia was called by the older writers *atrichia*. As its name indicates, it is congenital baldness.

It may affect the whole head or only part of it. It is a complete baldness, without even lanugo hairs. Most children are born with a fair complement of hair. Sometimes it is long and dark, and at other times only lanugo hairs are present. The dark hair falls shortly after birth, to be replaced by lanugo hair, and the lanugo hair in its turn becomes stronger. But in alopecia adnata there is not the slightest trace even of lanugo hairs, either on the scalp or eyebrows. In some cases the complete baldness is limited to certain regions. As a rule the condition is a transient one, the hair growing after some months or years, though perhaps not as luxuriantly as it does in other children. In pronounced cases delayed dentition or a deficiency in the teeth has been observed. Apart from the absence of the hair there is usually no other abnormality of the scalp. Cases of congenital absence of hair with a condition of keratosis pilaris of the scalp have been reported, but they do not properly belong here. Hill (Brit. Med. Jour., 1881, i, 177) is authority for the statement that in Australia there is an aboriginal hairless race of men.

Pathology.—The disease is due to arrested development of the piliary system. In inveterate cases microscopical examination of sections shows a more or less complete deficiency of hair-follicles, with a number of rudimentary hairs. Hutchinson (Brit. Med. Jour., 1886, i, 929) met with one case in which there was also an atrophic condition of the whole skin and an absence of nipples.

Etiology.—As a theory we can assume an error of innervation as one cause of the deformity. In some families it is said to be hereditary.

Prognosis.—The prognosis is usually good ; the hair will eventually grow in the majority of cases.

Treatment.—We really can not do very much to cause the hair to grow, beyond looking after the nutrition of the child and keeping the scalp in a healthy condition. In an infant we would scarcely think of using anything more stimulating than soap and water. As the child grows older we may employ some of the more stimulating remedies, as given under alopecia presenilis.

Alopecia Senilis.—This is the loss of hair that comes as a consequence of advancing years along with decaying teeth and failing eyesight. From the forty-fifth to the fiftieth year man is at his prime, and when the hair begins to fall at about this time we speak of it as senile. The hairfall may have been preceded for some years by canities, but often the hair falls before it becomes gray. The hair becomes thin at first, in most cases on the vertex forming the tonsure. It may begin anteriorly, forming the receding forehead, or the whole top of the head may be affected at the same time. Before the hair falls it becomes thinned in its diameter and loses its luster and suppleness. The spread of the bald area is always symmetrical, and in the vast majority the hair over the temporal and occipital regions is spared. A tuft of hair over the middle frontal region is spared sometimes for a long time. The scalp appears smooth, shiny, stretched, thinned, and sometimes oily. It can be felt that the scalp is drawn tighter upon the skull than it should be. Not only does the hair fall from the scalp, but it may also do so from the axillæ and pubic region. I have never seen this occur in men, but I have observed it in women. It is very rare that the beard falls.

Pathology.—The loss of hair is due to a process of gradual atrophy of the scalp and subcutaneous tissues, in which the hair-follicles sympathize, lose their vitality, and finally disappear. The retrograde process begins in the arterial supply to the scalp, a fibrous endarteritis narrowing the lumen of the cutaneous arteries, and at last obliterating the capillary circulation about the hair-follicles.

Prognosis.—The loss of the hair is permanent, and little if anything can be done to stay its course. Exceptionally and very rarely a new growth of hair has occurred in old age.

Treatment.—There is scarcely any use in endeavoring to treat these cases. If the atrophic stage has not been reached, perhaps stimulation may do some good, as detailed in the next section.

Alopecia Presenilis seu Prematura.—Alopecia occurring before middle life may be idiopathic or symptomatic.

Alopecia Presenilis Idiopathica.

Symptoms.—This form of alopecia corresponds in every particular to the senile form, excepting in the point of the age of its subject. It comes on without antecedent or concomitant local disease of the scalp, or disturbance of the general health. It usually does not begin before the twenty-fourth or twenty-fifth year of age. Its progress may be rapid or slow, or intermittent. Canities does not precede it. In its symmetry, distribution, and general course it is the same as the senile form.

Pathology.—The pathology of this form of alopecia is virtually the same as of the senile form, only the atrophic process has begun earlier. There is a gradual narrowing and final disappearance of the meshes of the connective tissue beneath the aponeurosis of the occipito-frontalis muscle, an obliteration of the blood supply to the hair-follicles, and at last the latter are destroyed, partly by the cutting off of their nutrition and partly by the pressure exerted upon the follicle by the narrowing of the meshes of the connective tissue. As to the hair itself, it first does not reach its typical length, and there is an increase of the hair-fall. Later the diameter of the individual hairs lessens, and at last no new hair is produced.

Etiology.—Heredity is the main cause of the disease. I have found, by a study of one hundred consecutive cases of loss of hair, that this element was marked in forty-six per cent of them, and that it showed a strong tendency to descend in the same sex. In every case in which women were affected some ancestor on the maternal side had been bald. In fifteen per cent of the cases in which a history of baldness occurring only in the paternal line was found the patients were men. Women are far less often bald than men. This may be accounted for by several theories: 1. The wearing by them of lighter and less impermeable head gear. 2. The greater care they give to their hair. 3. The preservation of the natural fat cushion underneath their scalps. The last is the most probable explanation. Severe mental labor, especially if it is combined with anxiety, seems to have a certain influence in causing early loss of hair. So, too, has daily sousing of the head in water, which was noted in twenty-one per cent of my cases. The wearing of tightly fitting caps or hats may have some influence in producing baldness, but it is probably not as great as it has been supposed to be. Pincus believes that a chronic eczema, or impetiginous eruption on the scalp, in the years preceding puberty, is, next to heredity, the most active etiological factor. Improper care of the scalp is certainly a predisposing condition. Race has some influence; the American Indian is said by Holder (Med. Record, 1892, xlii, 357) never to grow bald.

Prognosis.—If the loss of hair has not progressed too far, we may sometimes check its further fall. If a family history of early loss of hair is well marked, the outlook is bad. If the scalp is already atrophied and bound down, we can do nothing.

Treatment.—In the treatment of the idiopathic form of baldness we can do more by prophylaxis than by any other means. This is especially true in cases in which heredity is well marked. Prophylaxis consists in the care of the scalp by proper hygienic methods, and such care can not be given too soon.

The Hygiene of the Hair.—We should instruct the parents as to the importance of giving attention to their children's heads, so that the matter may not be delayed too long, and the hair fall out when it is too late to stop it.

The hygiene of the hair and scalp consists in the proper use of the shampoo; in brushing and combing; in arranging the hair, especially in women; in the exposure of the hair to air and light, especially in men; in cutting it; and in the use, or rather avoidance, of pomades.

Shampoo.—The first attention that the hair demands is the ridding of the scalp of the newborn child of the *vernix caseosa.*

To this end the scalp is to be saturated with sweet-almond oil, which is the most elegant means, or with olive oil or vaseline. It is preferable to use these in their natural state, but if desired there is no objection to perfuming them with a few drops of the oil of bergamot, wintergreen, or the like. The nurse should do this immediately after she has washed the child's face and eyes. Then, after the body has been bathed and the infant dressed, the head should be washed with plenty of warm water and soap, such as pure castile, or glycerine soap, either solid or liquid. This should be done very gently, and if the *vernix caseosa* is not readily removed, reapply the oil and wait until the next day, when it will be easily washed off. Should it still prove obstinate, patiently repeat the process until it comes off. In no case use the fine-toothed comb. For some weeks the infant's scalp should be lightly oiled, as this will prevent any accumulation of sebaceous matter, and protect the tender skin from injury from atmospheric causes until the hair grows, care being taken to wash the head daily to prevent the oil from becoming rancid. When the hair is grown the scalp need not be so often oiled, nor should it be washed more than twice a week.

In children and adults the scalp should be kept clean, so as to avoid stopping up the hair-follicles with foreign matter, and to prevent any irritation of the scalp which its presence might cause. This is accomplished by the systematic use of the shampoo, followed by careful drying and the application of some oily substance to the scalp. It may be given as a rule that a shampoo every second to fourth week is sufficient for the scalp of those who are not exposed to more than the usual amount of dust; while those who are so exposed should shampoo their heads every week or two.

The daily practice of sousing the head with cold water is pernicious, not because the water itself is harmful, but because the scalp is not properly dried afterward, no oil is applied to take the place of the oil that has been removed by the water, the wet hair can not be thoroughly brushed, and soon gets into a condition of dryness and brittleness.

The proper manner of shampooing the head is as follows: Choose some good soap, such as "Pears's Glycerine Soap," "Sarg's Liquid Glycerine Soap," pure castile soap, the tincture of green soap, or the tincture of prepared olive soap, and with plenty of warm water make a good lather on the head and rub the head vigorously with the fingers, or with a rather stiff, long-bristled brush. If the scalp is very sensitive to irritants, borax and water may be used instead of soap, or a mixture composed of the yolks of three eggs beaten up in a pint of lime-water, either of which will make a good lather with water. When the head has been thoroughly shampooed, wash out the lather with a copious supply of warm water, or, where practicable, with alternate douches of warm and cold water, and then dry both scalp and hair with a good bath towel. When all is dry, rub on the scalp, not on the hair, a small quantity of some unctuous substance, such as sweet-almond oil or vaseline. Care must be used in drying the hair, especially in women, who should sit before an open fire or in the sunlight in so doing, and should not dress the hair until it is perfectly dry. To oil the scalp the hair should be parted and the oil rubbed in along the part, then another part made and the operation repeated, and so on till the whole scalp is gone over. Should there be an excess of oil upon the hair, a condition which is disagreeable to many, it may be removed readily by pulling the hair between the folds of a towel moistened with ether, chloroform, or cologne water.

Brushes and Brushing.—The brush which is to be used upon an infant's head should have long, soft bristles, so as not to scratch or irritate the tender scalp, and should be employed simply in smoothing and polishing the hair. For young children whose hair is well grown, a stiffer brush is necessary, and for adults two brushes should be used, a stiff one and a soft one. A properly made brush has its bristles placed in little clumps or groups in such a manner that the middle bristles of each group are longer than those of the periphery. The bristles are well set into the back of the brush, and the groups are wide apart. The brush should be used systematically in the morning, and with considerable vigor, so as to produce a feeling of warmth in the scalp, and to brush out all particles of dandruff and foreign matter lodged in the hair. Every part of the scalp should be gone over with a stiff brush, and then it should be laid aside for the rest of the day, and the soft one used to assist the comb in parting the hair, and to give smoothness and gloss to it. The stiffness of the brush and the vigor of its employment must vary with the tenderness of the scalp, and in no case should be sufficient to cause a feeling of soreness.

Combs and Combing.—A properly made comb has long, thick, wide, perfectly smooth teeth with well-rounded ends, and set wide apart. It should be used only as an assistant to the brush, and always with it in the systematic morning brushing. No comb should touch an infant's scalp, and the fine-toothed comb should be rigorously excluded from the toilet-case.

Dressing of the Hair of Women.—The simplest mode of wearing the hair is the best. It should be combed and brushed smoothly back upon the top of the head, either parted or not, as is most becoming, and gathered into a loose braid or coil at the back of the head. Girls should wear a pendant braid, and women whose hair is grown and who gather the hair into a coil should use large hair-pins in fastening it, preferably of rubber or bone with absolutely smooth surfaces. In doing up the hair care should be taken not to drag upon it; and drawing it into unnatural positions, such as pulling the hair from the back of the head over forward to near the forehead, should be avoided. If a woman's hair does not curl of itself, she should not attempt to make it curl by singeing and squeezing it between hot irons, scorching it over a hot pipe-stem, or twisting it up tightly in curl-papers.

Wigs, Hats, etc.—The hair requires for its growth and for the maintenance of its health both air and sunlight, though not necessarily exposure to the direct rays of the sun. It is difficult to prove that wearing of the hat constantly is a cause of baldness, but there are many indications that such is the case, and it is well to avoid keeping the head covered with an unventilated hat. If the occupation compels one to be out of doors most of the time, or exposed to draughts so that a hat or cap must be worn, it should be well ventilated, so that the heat from the head may not become confined and the head more or less sweated.

Hair-Cutting.—All men wear the hair short and employ a barber at varying intervals, according to their fancy. As far as the health of the hair is concerned, it is immaterial whether it is cut at longer or shorter intervals, but it is essential that it should be well cut, and a good barber is desirable. It should never be "shingled," as the barbers term an operation which consists in cutting the hair by a to-and-fro motion of the shears, as this tears and roughens the hair.

The hair of children, whether they be boys or girls, should be kept short until the seventh or eighth year of age, as the growing hair is a drain upon the nutrition of the body, and at this time of life all the nutritive forces should be expended in the growth of muscle and bone. The hair of a girl after she has reached her eighth year should be allowed to grow, as the less the hair is cut the softer it is, and for a woman a head of fine hair is much to be desired. But should the girl be so situated that her scalp and hair can not be properly cared for, then she will have a better chance for a good head of hair later in life if it is cut when she is young.

It is quite common for the long hair of women to be split at the point. This should be looked for, and if found, the hair should be cut above the cleft. All ragged ends should be lopped off, and all weak hairs should be cut off near the head to improve their strength.

Pomades.—Their regular use upon the healthy scalp is uncalled for. They are dirty, soon become rancid, and emit a foul odor, unless this is covered by some strong perfume, and they soil whatever the wearer's head comes in contact with. If the rules already given are followed, the hair will be smooth and have sufficient luster for beauty without pomades. If the scalp is diseased, advice should be sought, and the proper remedies obtained.

As the hair sympathizes with the general health of the body, the latter should be maintained in good condition by a wise conformity to the laws of health.

If the hygiene of the scalp had not been begun before, it should be as soon as the hair begins to fall. Besides this we must employ stimulation in some form. Equal parts of the oil of turpentine and any indifferent oil or alcohol is commended by Lassar (Therap. Monatshft., 1888, No. 12). Gallic acid, three per cent in oil; tar; tincture of cantharides ʒ j—℥ ij; tincture of nux vomica in same strength; the essential oils; sulphur ointment—all may be tried. Of these, sulphur ointment I believe to be the best when thoroughly used. Pilocarpine and jaborandi have their advocates, and may be used externally or internally. Lassar gives the following formula:

℞ Pilocarpin. hydrochlorat.	gr. xxx (2 grm.)	
Vaselini	ʒ v (20 grm.)	
Lanolini	℥ ij (60 grm.)	
Ol. lavandulæ	gr. xxv.	M.

Cottle gives this formula:

℞ Ac. acetici	℥ ss. (12 grm.)	
Pulv. boracis	ʒ j (3 grm.)	
Glycerini	ʒ iij (9 grm.)	
Spts. vini	℥ ss. (12 grm.)	
Aq. rosæ	ad ℥ viij (200 grm.).	M.

Ammonia water is a good stimulant, though it requires the application of a little oily substance occasionally to keep the hair from becoming too dry. Cottle uses ammonia as follows:

℞ Liq. ammon. acetat.	℥ ij (50 grm,)	
Ammon. carbonat.	ʒ ss. (1·50 grm.)	
Glycerini	ʒ iij (9 grm.)	
Aq. sambuci	ad ℥ viij (200 grm.).	M.

Pincus has found benefit in the early stages of this form of alopecia from rubbing into the scalp for two to five minutes on two to four successive days one or two tablespoonfuls of a solution of one drachm of bicarbonate of soda to half a pint of distilled water. Galvanism by means of a metallic electrode has been recommended by several authors; and static electricity by means of a Glaser or Töpler-Voss machine is highly spoken of by Meyerhausen (Internat. klin. Rundschau, 1890, iv, 1841). Massage of the scalp is worthy of trial. Other stimulating remedies will be given under Alopecia Presenilis Symptomatica.

With any form of local treatment we should endeavor to have our patients take the best of care of their health and spend several hours a day in the sun and air.

Alopecia Presenilis Symptomatica.—As its name indicates, this variety of loss of hair is dependent upon some disease of the scalp or general economy of the body. It has four varieties, namely: Alopecia furfuracea seu pityrodes; defluvium capillorum; alopecia syphilitica; and alopecia follicularis.

1. Alopecia Furfuracea seu Pityrodes.—This is the form of baldness which we are most often called upon to treat, and is readily recognizable by the presence of either a seborrhœa, a seborrhœal eczema, or a pityriasis upon the scalp. The hair is usually dry, and after the seborrhœa or pityriasis, which for convenience we may speak of as dandruff, has lasted for some years, the hair commences to fall, and baldness slowly declares itself. The course of the fall of hair, and the parts of the scalp affected, are the same as in the already described forms of alopecia. With the increase of the baldness we commonly see a diminution of the dandruff, so that when complete calvities is established the scalp may be free of any evidence of disease excepting the atrophy. In some cases, if there has been a seborrhœal eczema, this will continue even after the hair has fallen.

Etiology.—The cause of the hair-fall is dandruff. In a hundred unselected cases of alopecia in my own practice, seventy had some form of seborrhœa, as follows: Seborrhœal eczema, five cases; pityriasis, ten cases; seborrhœa oleosa, three cases; seborrhœa sicca, fifty-five cases. It does not follow from these figures that dandruff necessarily results in baldness. Many people have an abundant dandruff for years or life without permanent loss of hair. These patients have an unusually vigorous growth of hair. The large proportion of cases in which baldness follows or attends upon dandruff does show that it is quite capable of causing it. Young adults are those most often affected by this form of alopecia. It is said that women are more often affected with it than men are, but that with them it is more transient.

For some years the opinion has been gaining ground that dandruff is contagious, and therefore alopecia pityrodes is contagious. Various parasites have been described in this connection, but none has succeeded in holding its own as the cause of the disease. As far back as 1874 Malassez (Archiv de Physiol. Norm. et Path., 1874, p. 465) and Chinchole (De la Nature Parasitaire du Pityriasis, etc., Paris, 1874) each described a parasite in connection with the disease, which Bizzozero's (Gaz. d. Hôp., 1884, No. 29) later investigation showed to be spores very commonly found upon the normal human skin. Unna (Monatshefte f. prakt. Dermat., 1892, xiv, 413) has isolated a coccus in seborrhœal eczema that he thinks may be its cause, and has been successful in producing alopecia pityrodes by inoculating rabbits with it. Lassar and Bishop (Monatshefte f. prakt. Dermat., 1882, i, 131) succeeded in producing typical alopecia pityrodes in guinea pigs by rubbing upon their backs a pomade composed of vaseline and the scales taken from the head of a man suffering from the same disease.

Bad hygiene or lack of care of the scalp predisposes to dandruff, and hence to alopecia pityrodes. Brocq (Annal. Derm. et Syph., 1892, iii, 773) believes that many cases of so-called alopecia furfuracea are really due to keratosis pilaris.

Pathology.—The pathology of seborrhœa is ably given in this system under its proper title, and need not be detailed here. The hair-follicles sympathize with the sebaceous glands, as the lining membrane of the former is continuous with that of the latter, and after a time the nutrition of the hair is interfered with, and it falls out. Eventually the papillæ become atrophied and the baldness is permanent.

Diagnosis.—The presence of dandruff, or seborrhœal eczema, or a history of the same, will differentiate this form of alopecia from senile alopecia and the idiopathic form of premature baldness; while the lack of circular or oval bald patches will distinguish it from alopecia areata.

Prognosis.—If the disease is taken in time, when it has just begun, there is a good prospect of stopping the hair-fall and regaining the loss. When the fall of the hair has lasted for some years and calvities has begun to show itself, the prognosis for restitution of the loss is poor, though it is frequently possible to stay the progress of the disease for some years. The prognosis in women is always better than in men. In all cases the patient should be told that it will be months before he can expect to see any marked improvement, as time must be given for the already diseased hairs to fall and the new ones to grow in.

Treatment.—If we recognize that dandruff is not so innocent a disease as the laity regard it as being, and instruct the parents to take care of their children's scalps, we will accomplish a great deal to prevent alopecia pityrodes. The hygiene of the scalp, as given under alopecia presenilis idiopathica, is no less valuable here. The treatment of the disease is the treatment of the dandruff, or seborrhœal eczema. This is given under seborrhœa elsewhere in this system. I would state that it seems to me that oily applications are better than alcoholic preparations in the care of the scalp, though they are more disagreeable. The mistake is often made of prescribing tincture of cantharides or other irritant in every case of alopecia. Such remedies do harm in alopecia pityrodes where we have already a more or less irritated condition of the scalp. Sulphur, or the ammoniate of mercury in vaseline, will render good service in the strength of a drachm of the former or twenty to thirty grains of the latter to the ounce. Apart from simply addressing our remedies to the dandruff, there are a number of plans proposed for checking the fall and restoring the growth of the hair. Of these, the one that has been most vaunted during recent times is that one proposed by Lassar, of Berlin, as follows: The scalp is to be vigorously washed each day with a tar soap that forms plenty of suds, and the washing continued for ten minutes; the suds are then to be washed out with warm water, followed by cold water, the scalp dried and anointed with equal parts of a half-per-cent solution of bichloride of mercury, glycerin, and cologne water; the scalp is then to be rubbed dry with a half-per-cent of β-naphthol in absolute alcohol. Then the following oil is to be applied:

℞ Salicylic acid	ʒ iv (16 grm.)	
Tinct. of benzoin	gr. xl (3 grm.)	
Neat's-foot oil	℥ iij (100 grm.).	M.

This complicated procedure is to be kept up for six or eight weeks, and requires about ten minutes a day. It is advised that the mercurial solution should be used many times a day in obstinate cases.

Ihle (Monatshefte f. prakt. Dermat., 1885, iv, 429) was one of the early ones to recommend resorcin in the following:

℞ Resorcin. pu.	gr. xv (1 grm.)	
Ol. ricini	ʒ ss (2 grm.)	
Spts. vini rect.	ad ℥ i (30 grm.)	
Bals. Peru.	gtt. ij	M.

β-naphthol in three to ten-per-cent strength in oil and alcohol, daily applied, does well in some cases. Tar, preferably the oil of cade in oil and alcohol, half a drachm to a drachm to the ounce, is excellent when the condition of the scalp is one of pityriasis. It is objectionable on account of its odor and color.

Piffard recommends the following:

℞ Picis liquidæ,		
Ol. lavandulæ	āā ʒ j (4 grm.)	
Ol. pini sylvestris	℥ vj (200 grm.)	M.

Ichthyol, ammonio-sulphate, is said to be efficacious, but its odor is objectionable. Bicarbonate of soda in two-per-cent strength, either in solution or in vaseline, applied daily, has been recommended, a little simple pomade of any sort being used if the hair becomes too dry.

In advanced stages, when the calvities is pronounced and the dandruff is lessened, the remedies useful in alopecia presenilis idiopathica may be tried; but as long as there is more or less of seborrhœa, pityriasis, or seborrhœal eczema present, our best chance of cure is in treating those conditions.

2. **Defluvium Capillorum.**—By this is meant that rather sudden and general thinning of the hair which comes on during or follows some acute illness, such as fevers, parturition, mercurialism, or some cachexia. While most often the scalp is the part affected, all the hair from the body may fall. As a rule, however, the hair is merely greatly thinned, but there is no calvities. While this hair-fall may occur during the illness, it is only when that is greatly protracted. Most usually it comes on during convalescence, perhaps not until two or three months from the onset of

the fever. The fall is sometimes very rapid, the hair coming out in handfuls. In other cases a smaller amount falls at once, but the fall is more persistent. The scalp may appear normal, or there may be more or less dandruff on it.

Etiology.—The fall of hair is due to the hair papillæ sympathizing in the general disturbance of the system, their nutrition being more or less temporarily interfered with.

Prognosis.—In the vast majority of cases the loss of hair is but temporary, and we can encourage our patients to expect a growth of hair from the old papillæ that shall equal the original amount. The younger the patient is the better will be the prognosis.

Treatment.—Attention to the hygiene of the scalp is all that is necessary in most cases. It is from these cases that many patent hair tonics have gained their reputation, Nature doing the work, while Art sees that the road is cleared of *débris.* We must not forget that the trouble is one of denutrition of the system, and we must remember that the sooner we can get our patient into vigorous health the sooner and the better will the hair grow. If it is desired, any of the stimulating lotions already given may be employed.

Alopecia Syphilitica is that form of baldness occurring as a consequence of syphilis. It may occur either early or late in the disease, and take the form of a general or localized calvities or alopecia. It occurs both in benign and malignant cases.

Occurring early in the disease, within the first year—generally within the first six months—it takes the form of irregularly shaped bald or partially bald areas scattered about among the sound hair, and giving the appearance like to what would be produced by cutting the hair carelessly with a pair of dull shears. Rarely we may have a loss of hair from over the whole body. The broken arch of the eyebrows is characteristic of syphilis. The pubic hair and the ciliæ may also be lost. Dandruff may or may not be present. Women are said by Fournier to be more often affected than men. The localized patches of baldness occur late in the disease, as the result of destructive processes taking place in a syphilide, and involving the hair-follicles. It is properly a variety of alopecia follicularis.

Etiology.—The cause of this form of alopecia is syphilis. In the cases occurring early in the disease it is due to the syphilitic hydræmia and cachexia that interferes with the nutrition of the hair-follicles. Giovannini teaches (Arch. Derm. u. Syph., 1892, xxiv, 1022) that in the early stage of syphilis we have a deep folliculitis pilaris that causes the baldness. In the cases occurring late in the disease it is due to larger or smaller syphilitic deposits undergoing absorption or ulceration, and destroying the hair papillæ and follicles.

Diagnosis.—Syphilitic alopecia bears a close resemblance at times to *favus*, but is diagnosed from it by its sudden onset and the complete absence of favic crusts and fungus. Moreover, in favus we do not have ulceration, and in syphilis there will be sure to be some other symptom of the disease to put us on our guard. *Alopecia areata* presents more sharply defined oval patches, which are perfectly bald and smooth; in syphilis the patches are of irregular shape, and usually are not perfectly bald. Its sudden onset, the broken arch of the eyebrows, and the presence of some other syphilitic lesion, should diagnose it at once from the other forms of *alopecia.*

Prognosis.—The early variety of syphilitic alopecia is generally recovered from as health is restored by judicious treatment. Here again, the younger the patient is the better his chance of recovery. Bald patches caused by destructive syphilitic lesions are permanent.

Treatment.—The underlying cause of the disease, the syphilis, must be treated rather than the scalp in the early variety. A mercurial ointment or a solution of the bichloride may be prescribed as stimulants.

For a more extended account of this variety of alopecia the reader is referred to Vol. II of this system, under Syphilis of the Appendages of the Skin.

Alopecia Follicularis.—Under this heading are placed those cases in which loss of hair is due to some disease of the scalp that causes destruction of the hair-follicles. The baldness is nearly always in patches, and is most often permanent. The symptoms are those of the disease causing the baldness, plus the loss of hair.

Etiology.—Many diseases will cause alopecia follicularis. Thus it is seen with impetigo, long-continued sycosis, dermatitis papillaris capillitii, erysipelas, syphilis, lupus erythematosus, favus, and ringworm.

The diagnosis, prognosis, and treatment are the same as of the diseases that cause it, and will be found elsewhere in this work.

ALOPECIA AREATA. (A. R. ROBINSON.)

Synonyms: Area Celsi; Porrigo Decalvans; Tinca Decalvans; Alopecia Circumscripta.

Definition.—An affection of the skin characterized by the appearance of one or more circumscribed bald patches upon apparently normal skin.

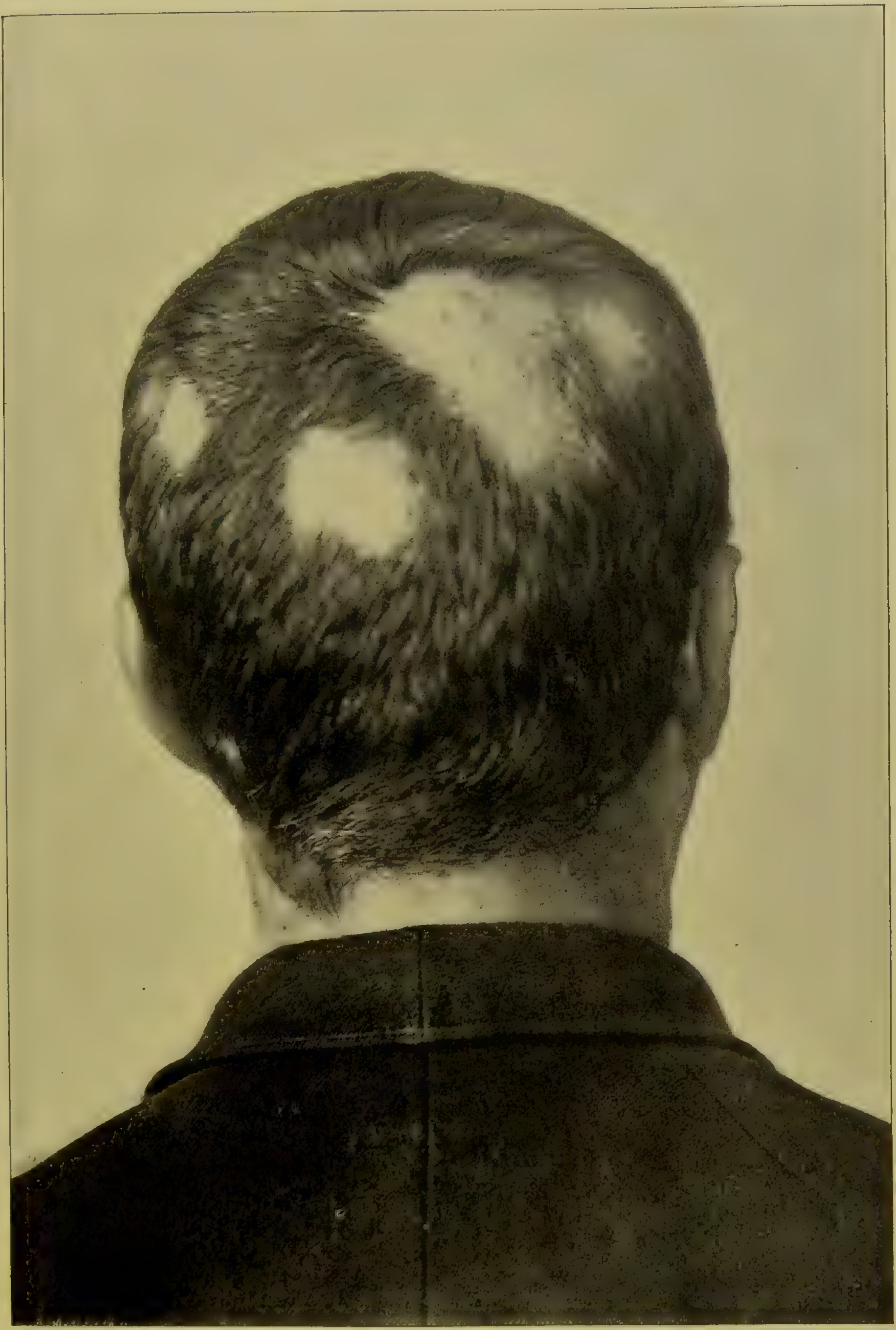
Symptomatology.—Alopecia areata affects most frequently the scalp and face, but occurs also in the axillæ and pubes, and even on any part of the body covered with large or fine hairs. The symptoms of ordinary alopecia areata are as follows: Usually no local subjective symptoms of any kind precede the formation of a bald spot, but a slight itching is present in some cases. The hair may fall out very rapidly, so that the first thing the patient observes is that he has a bald spot the size perhaps of a ten-cent piece; perhaps it is smaller, or even slightly larger. In a few cases the spot may not increase in size to any appreciable degree after it is first observed, but usually it becomes larger by rapid or slow falling out of hair at the periphery. The hair at the margin is for a short distance thinner than normal, is usually easily extracted without causing any pain, and shows a character to be described later on. A patch may continue to increase in size by peripheral extension until it acquires a diameter of several inches, the direction of extension being regardless of vascular or nerve territories, or they may not become larger than a twenty-five or a fifty-cent piece. This manner of spreading, commencing as a small spot and increasing in size by well-defined peripheral extension, is characteristic of the majority of cases of this disease, and I believe should be regarded as a necessary method to justify the diagnosis of alopecia areata.

A small spot sometimes forms rapidly, and instead of increasing in size remains stationary for a length of time and then disappears, but the rule is that they increase in size slowly or quickly, to occupy a greater or less area of the skin. The shape of a patch is also of significance. On account of the spreading by peripheral extension it is usually circular or nearly so, but may be oval, and I have several times observed a patch show continued extension at a part of the periphery only, giving a bay-like form to one part of the patch. All those cases in which, after injury to a nerve for instance, there is simultaneous falling out of hair over a considerable area, corresponding usually to a nerve territory, are, according to my view, not examples of the same condition which causes the production of the patches I am describing. Schütz (Beitrag für Aetiologie und Symptomatologie der Alopecia Areata, Monats. f. prak. Derm., 1887) reports a case of alopecia from peripheral nerve lesion. The bald spot, however, was not round, but triangular in shape, was not sharply limited, and there was general thinning of the hair. The bald spot corresponded to the area of the occipitalis magnus nerve. Other examples of alopecia in areas from different causes have been reported as examples of alopecia areata, but which have not shown all the clinical characters of the ordinary form, and should not be classed with it, especially when discussing the etiology of the disease.

A patch of alopecia areata in the stage of extension has the following characters: The bald patch is almost always smooth, shining, and whiter than normal, and depressed below the general surface, as can be recognized by passing the finger over the part. Sometimes a few lanugo hairs can be seen if the patch is not very recent. It is usually stated that there is never any redness, but I have several times noticed slight redness and œdema of short duration. The sensibility of the part is unchanged, and there is less blood than usual in most cases, as shown by pricking the part with a needle. Slight scaling has been observed in a few cases. There are no signs of vesicles or pustules, or scar-tissue formation. The follicular orifices are less distinct than normal, and the skin feels thin, smooth, and dry. At the periphery the hair is thin and the individual hairs easily extracted. The area of thin hair extends only a short distance from the margin of the bald spot (see plate). By falling out of these hairs the patch gradually extends and increases in size until sooner or later it ceases to extend, and the hairs at the margin are then normal in character and number. The size of a patch varies from about a third of an inch in diameter to several inches. There may be only one patch, or several may be present. It is rare to find more than one or two form simultaneously at the commencement of the disease, but when several are present the others form at later periods. Usually the patches are irregularly scattered over the affected region—as for instance the scalp—and are often unilateral, but sometimes are symmetrical. When in the course of extension adjoining patches unite, the shapes of the bald areas change, but their origin from individual round patches can always be recognized as long as hair exists at the periphery. By the union of several patches or by extension of a single one large areas of baldness form, until perhaps eventually only a thin fringe of hair remains, extending from each ear to the nape of the neck, or there may even be complete alopecia of the scalp.

Usually a patch is completely devoid of large hairs, but not infrequently a few scattering hairs are present and may be firmly seated in the skin. The hairs also do not always fall out entire, as an occasional broken-off hair is often observed in patches of pure alopecia areata. At the very earliest period of formation no lanugo hairs are to be seen, but very soon fine, downy hairs are visible. If they are not present in cases of several weeks' duration, it may be concluded that the hair-follicle has been destroyed and permanent alopecia will be the result.

After persisting for a variable length of time, usually for months, the process comes to a standstill, and the spots may remain apparently unchanged for many months or quickly disappear. The rule is, that when the hair commences to grow upon a patch it does so rapidly; at first lanugo hairs are seen, which may gradually become stronger, but in most cases these fall out, perhaps more than once, before a growth of normal hair appears. In some cases, especially where large areas are affected, the restoration is irregular and slow. Occasionally a number of well-formed hairs, singly or in groups, appear, and afterward fall out, to be replaced perhaps by lanugo hairs, which exist a variable time, when, finally, normal hair growth occurs. The growth of normal hair takes place, as a rule, first at the periphery, and thus gradually reduces the size



Alopecia Areata (Robinson).

of the patch; but if the patch is large, the first normal hairs may arise within the patch. In some cases nothing stronger than lanugo hairs ever grow from the affected follicles, and in rare cases there is a complete permanent alopecia. Recurrences are not infrequent, and a number of cases have been observed in which the recurrence has been upon the seat of the previous spot.

In a considerable number of cases the skin of other portions of the body is involved at the same time. Wherever situated, the process begins with the characteristic circumscribed round spots. The beard, eyebrows, axillary and pubic hair may all fall out, and in certain cases the hair of the whole body. Cases of total alopecia are called *alopecia areata maligna.*

Anatomy.—The hairs which fall out have been the subject of much microscopical examination, and the conclusion has been that the changes which take place in the hair must be the result of an interference with the factors concerned in the growth of hair, as the changes observed are those of simple atrophy. In Fig. 92 is shown a number of hairs removed from the periphery of an extending patch.

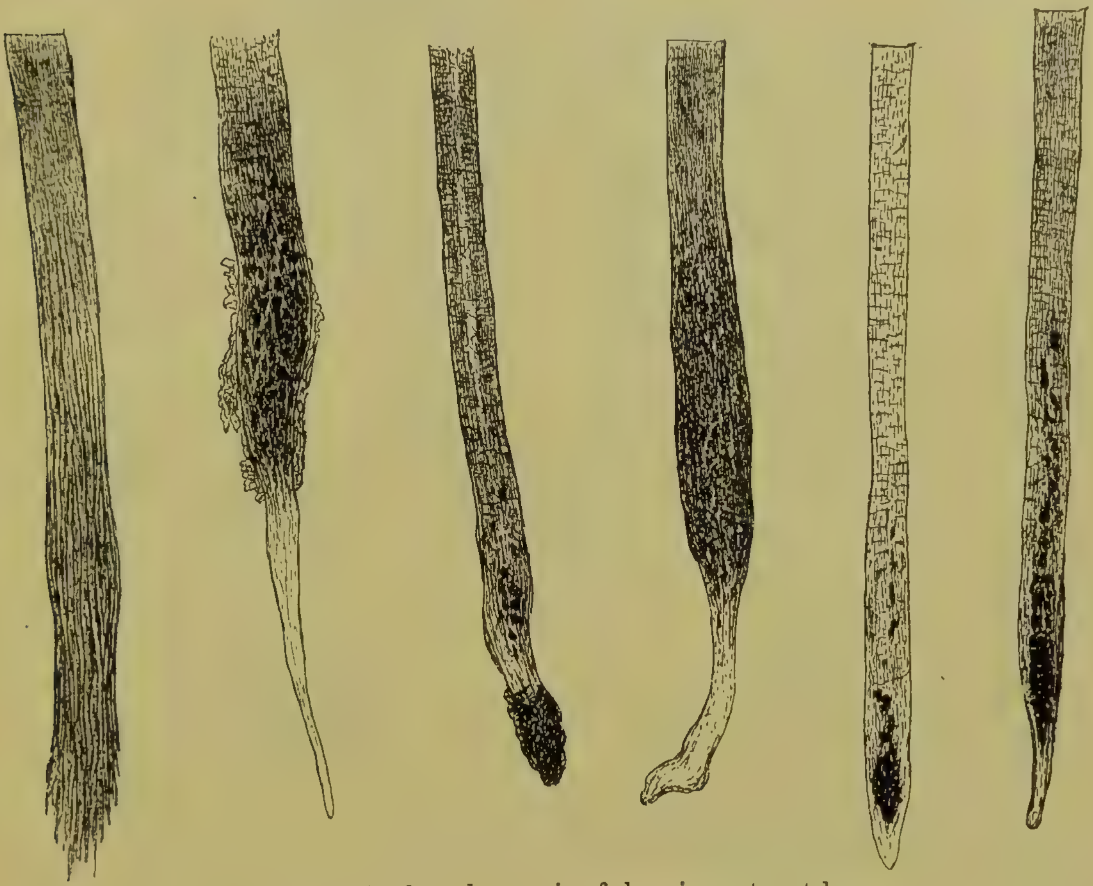


FIG. 92.—Hairs from the margin of alopecia areata patches.

As regards the changes in the skin, I have examined during the last ten years a large number of sections obtained from the living subject.

In 1887, at the Ninth International Medical Congress, Washington, I described the anatomical changes from a large number of portions of skin removed from seven patients, and showed that from the very earliest stage the process is an inflammatory one, affecting especially the corium and only slightly the papillary layer, and that the disease is not primarily an affection of the hair-follicles. During the last two years I have studied several hundred new sections, and am able to confirm the previous statements. S. Giovannini (Ann. de Derm. et de Syph., vol. ii, 1891) has made similar observations on twenty cases in various stages. In a patch two fifths of an inch in diameter and one week's duration I found that the epithelium and rete were normal, in the papillary layer were signs of slight inflammation, and in the corium there was marked inflammatory changes, as shown by the presence of considerable round-celled perivascular infiltration, which was *not general*, but *limited to areas* of the section, as shown in Fig. 93.

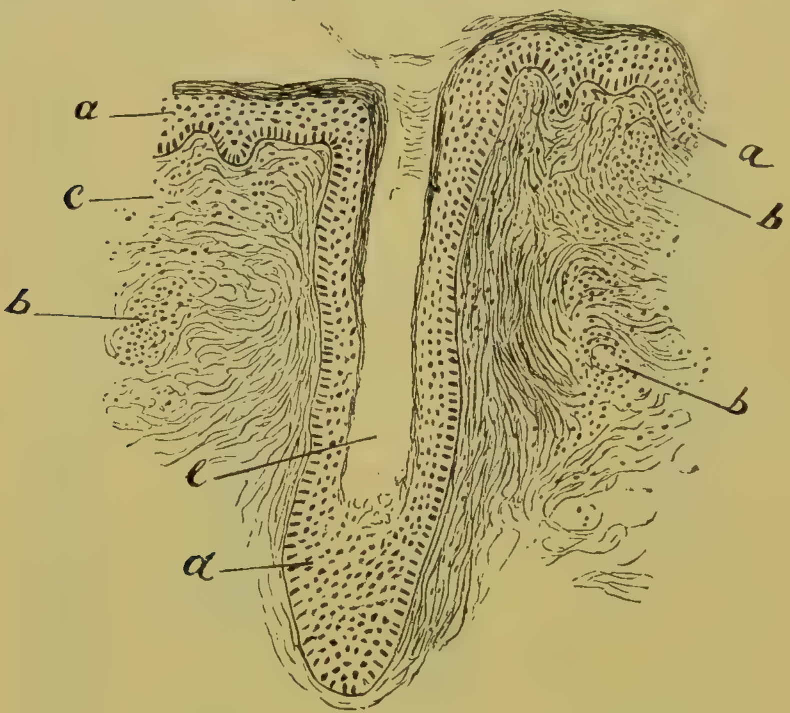


FIG. 93.—Section of skin from a recent patch of alopecia areata.
a, epidermis; *b*, perivascular round-cell collections; *c*, corium; *d*, external root sheath; *e*, space previously occupied by hair shaft.

The subcutaneous tissue was normal, as also sebaceous and sweat glands. There was dilatation of some of the lymph vessels, and in some places a fibrous coagulum was present in them.

The hair-follicles were either empty or contained normal or lanugo hairs. In some cases no papilla was to be found, the lower part of the contents of the follicles consisting of epithelial cells devoid of pigment, these cells forming a small hair shaft—a lanugo hair formed farther up in the follicle.

In other hairs and hair-follicles nothing abnormal was to be detected. Some of the hair shafts showed signs of interference with nutrition; there were splitting up and fibrillation of the shaft in a few cases, and an occasional stubbed hair.

In another case, in which the disease lasted only a few weeks, similar conditions were found.

In other cases of longer duration the inflammatory character of the process could always be observed. In some chronic cases thickening of the blood-vessel walls with narrowing of the lumen occurred.

In one case of many years' duration and with permanent alopecia the hair-follicles and sebaceous glands were destroyed, and there was some atrophy of all the tissues of the derma. The condition of the hair-follicles in this case is shown in Figs. 94 and 95.

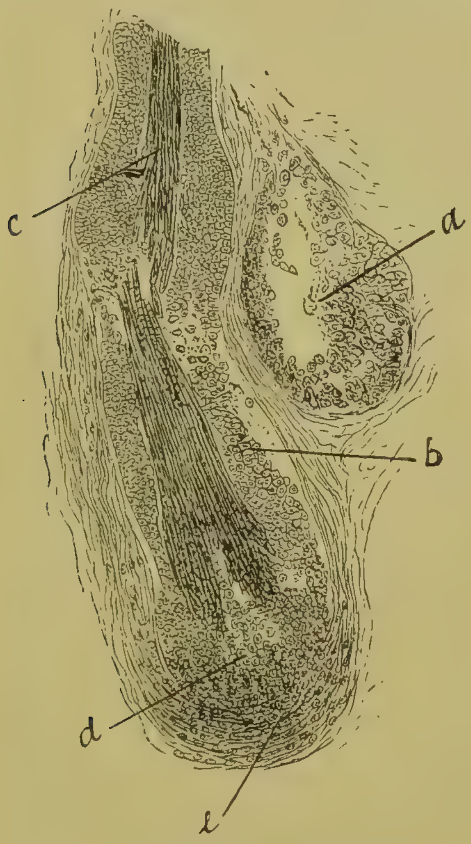


Fig. 94.
a, sebaceous gland; *b*, broken-down external root sheath; *c*, hair shaft; *d*, root of hair; *e*, follicle sheaths.

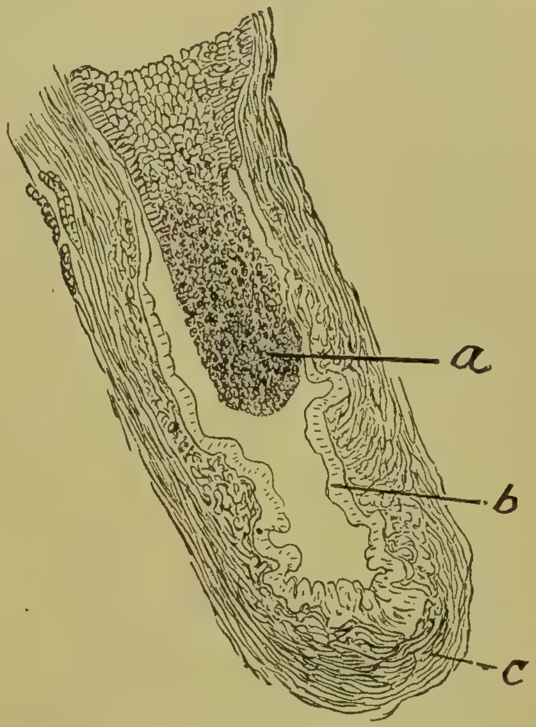


Fig. 95.—Section of hair-follicle in advanced destructive alopecia areata.
a, root of hair; *b*, basement membrane; *c*, follicle sheaths.

Notwithstanding the color of a patch, the process is unquestionably an inflammatory one, as shown by all my sections, from many cases of the disease.

Etiology.—Three views are held with reference to the cause of this disease: one view, that the alopecia is the result of a trophoneurosis; another, that it is caused by organisms; and the third, that sometimes it is trophoneurotic and sometimes parasitic. There is much to be said in favor of these views, and the majority of dermatologists to-day believe that some cases are trophoneurotic and others parasitic. I do not intend to discuss the question here, but would merely state that I hold that all cases of alopecia in which the patches increase in size by peripheral extension are parasitic, as shown by the anatomy, especially the inflammatory process *in areas*, at the same time not denying that hair may fall out in consequence of injury to the nervous system. With the exception, however, of general alopecia from shock, I am inclined to believe the nerve disturbance is only a predisposing factor. I will have occasion in a few weeks to enter fully into this subject, giving the results of experimental observations, microscopical and bacteriological, and maintaining the parasitic theory. Leloir makes a class of trophoneurotic alopecias from nervous trouble, as overcrowding in schools, worry, etc., and traumatism of the head. This class he has found sometimes in late syphilitics, and in one case it preceded a cerebral syphilis. Many instances are on record of an alopecia following injury to the nervous system. Dr. Crocker reports a case of a boy who fell upon his head and soon became completely and permanently hairless; and many others of somewhat similar character are on record. Max Joseph removed the spinal ganglia of the second cervical nerves in cats, and observed falling out of the hair in patches in the region supplied by the injured nerve; Mr. Hutchinson believes the disease is almost always a sequel of ringworm; and Crocker is inclined to the view that there is often a relationship between the two diseases. Vitiligo and alopecia areata have been observed on the same subject, and some have on that account thought the disease a neurosis. I have seen such a case this year, but the vitiligo had existed years before the alopecia appeared.

So many cases of alopecia from contagion have been published that no doubt can exist any longer of the possibility of acquiring the disease in that way. The epidemics among the military in some places in France, and also in schools, prove a parasitic origin of the disease, in some cases at least. Eichhoff reports ten cases directly traceable to a barber, and many of the French epidemic cases were supposed to be caused by the soldiers using the same hair-clipping machine.

It may be considered advisable—for the present, at least—to regard all cases of alopecia areata, in which the patches increase in size by peripheral extension, as caused by organisms, and not as a trophoneurosis.

Diagnosis.—Patches of baldness may occur in connection with many different conditions of the skin, as syphilis, favus, folliculitis decalvans, etc.; hence the presence of an area devoid of hair does not constitute an alopecia areata. The term alopecia areata refers to the most prominent clinical symptom in the disease under discussion, but it is only a symptom common to several diseases; hence it is necessary to take cognizance of all the symptoms in connection with the alopecia before the diagnosis of alopecia areata is justified. Usually the disease is defined as a baldness in patches which are sharply limited, and show no sign of scaling, suppuration, or scar-tissue formation. This definition enables one to exclude all alopecia cases in which there have been marked inflammatory symptoms, with or without destructive tissue changes, as cases of ringworm, syphilis, folliculitis decalvans, etc.; but it does not, in my opinion, sufficiently describe the condition connected with this symptom, baldness in circumscribed areas. The manner in which the bald spot forms, the whole clinical history connected with its formation, including the condition of the hairs and scalp, are to be taken into account if we are to succeed in forming a clinical entity and separating other diseases, if such there be, which cause a bald patch with similar anatomical characters. Bald patches of exactly similar objective characters, but with a different etiology, are often observed, and without a careful clinical history would be considered as the same disease, simply because a symptom is regarded as the disease. Cases of falling out of hair in patches in consequence of injury to a nerve, or from direct injury to the connective tissue, have been observed, and the characters of the resulting bald spot were similar to the ordinary cases of alopecia areata. The clinical history of the manner of formation of the patch, however, is different; and in this paper I have included under alopecia areata only those cases in which the patches form in a special manner—that is, by extension at the periphery. This would exclude cases of general alopecia from shock and such cases as the one reported by Schütz. I have seen an alopecia patch result from a traumatism, causing œdema and subsequent falling out of hair simultaneously over the whole injured area. The patch resembled one of alopecia areata; but I would not regard it as an example of that disease, although I am not prepared to say that the same organisms did not cause it, and that the injury was only a predisposing factor. Alopecia requires to be diagnosed from florid ringworm and folliculitis decalvans. In florid ringworm a few broken-off hairs are usually to be found, and the easily extracted entire hairs of alopecia areata are not present in the margin. In doubtful cases the microscope should be used. In folliculitis decalvans there is scar tissue formation and signs of folliculitis. Bald patches result from other diseases, but the inflammatory character or scar-tissue formation in all of them enables one to exclude alopecia areata.

Prognosis.—The disease tends to spontaneous recovery, but may last months or years, and sometimes is permanent. I have seen complete restitution in a case of ten years' duration. The smaller the patch, the slower it extends, and the younger the person the more favorable, as a rule, the prognosis. Recurrences are frequent.

Treatment.—As alopecia areata is a disease which tends to disappear spontaneously at no definite period of existence, sometimes after having existed only a few weeks, and again only after months or several years, it is not possible to judge of the therapeutic value of any method of treatment if used upon only a few cases. Those who regard the disease as a trophoneurosis have treated it in about the same manner as those who consider it to be parasitic. As the nature of the ground is an important factor in all parasitic diseases, everything should be done that tends to bring the general system into a normal physiological condition. It is not necessary to enter into a discussion of this subject, as each case must be treated according to the condition present. Some rely entirely upon internal medication and believe they obtain good results. A cure by such treatment is no proof of the non-parasitic nature of the disease, as shown by the great value of tonics, cod-liver oil, arsenic, etc., in undoubted parasitic affections. In addition to tonics in general, arsenic has been recommended as having specially beneficial effects. Duhring believes it is of value, and so do many others.

It is upon local treatment, however, that our principal reliance is to be placed, and I am satisfied that with energetic treatment the disease can be controlled in the majority of cases. The earlier the affection is seen and the fewer the patches, the easier to cure. The methods which have been employed with more or less success have been directed to destroying organisms directly or indirectly, or to so-called stimulation of the tissues. The amount of stimulation recommended, however, amounts to the production of an inflammatory condition, and hence if the disease is parasitic beneficial results are to be expected.

I have treated a good number of cases with different remedies upon the same person, either upon a single patch at various times, or upon separate ones on a patient at the same time, using different applications on the different places. After a good deal of experience I find chrysarobin the best remedy for recent cases and for many of long standing, while croton oil is often superior to chrysarobin in chronic cases. The only objection to chrysarobin is the danger of causing an acute dermatitis, which alarms the patient, and may be very disagreeable if the eyes are affected. The discoloration also, which tends to spread so far beyond the area to which it is applied, is very annoying and disfiguring for a time. It is, however, a very reliable remedy, and should be employed when possible. It should not be applied to alopecia of the eyebrows. The strength varies with the duration of the disease and the vulnerability of the skin. For children the strength should be much less than for adults.

It is best mixed with lanoline or vaseline, in proportions varying from fifteen to sixty grains to the ounce. As a rule, not more than thirty grains should be used for adults, and fifteen grains for children. If the desired result is not obtained within two or three weeks the strength should be increased. It should be well rubbed into the part once a day for one or two weeks, and then wait to see the result. If lanugo hairs do not make their appearance soon, or the hairs of the periphery continue to fall out, the treatment should be continued. If much dermatitis result, the application should not be made so frequently, or the strength of the ointment be reduced. The chrysarobin can be added to a solution of gutta percha or traumaticine, but I do not think it is as reliable as when used with vaseline. I have obtained excellent results from this drug used in the manner above stated. It is a powerful antiparasitic agent.

Croton oil causes a dermatitis and is useful in chronic cases, but should not be used in recent ones, as there is danger of causing a destructive suppurative folliculitis and consequent alopecia. When used, it should be mixed with olive oil or sweet oil. A twenty-five to fifty-per-cent preparation is strong enough to produce the required dermatitis, and this dermatitis should be kept up by occasional applications of the oil, the object being to produce a deep, subacute inflammation, and get the full benefit of the emigrated corpuscles and serum as antiparasitic agents, or possibly that of altered nutrition condition. In those chronic cases in which there is destruction of the hair-follicle all treatment is useless.

In severe cases Dr. Morrow recommends cutting the hair short and treating the part with acetic acid and chloroform, equal parts, or changing the amount of acetic acid in different cases or in different stages, repeating the application two or three times a week, or less frequently, later. Vidal recommends blistering the part until bullæ form, then applying a simple ointment, this to be repeated from three to ten times, while the rest of the scalp is rubbed night and morning with spirits turpentine 20 parts, ammonia 5 parts, and water 100 parts. In twenty-nine cases cures were effected usually in less than two months, and never longer than three months. Dr. Raymond (Annal. de Derm. et Syph.) advises washing the head twice a day with an antiseptic soap, and then each morning apply by friction the following: Solution corrosive sublimate, 50 centigrammes; tinct. cantharides, 25 grammes; balsam Fioravanti, 50 grammes; Cologne water, 150 grammes. In addition to this, the areas are to be brushed one to two minutes with a stiff brush wet with the solution, and the same evening rub in the following: Salicylic acid, 2 grammes; β-naphthol, 10 grammes; castor oil, 100 grammes. The treatment should cause redness, but not inflammation or excoriation. In all the cases treated by this method the hair grew in one month; the average of all was fifteen days.

Dr. E. Chatelain (Annal. de Derm. et Syph.) recommends the following treatment by iodized collodion: 1 to 30, applied every few days—four or five—going beyond the edge of the patch, and washing the rest of the scalp with some antiseptic. If dermatitis is produced, must stop treatment for a few days. A reapplication is made as soon as the old is thrown off. He thinks it cures by excluding air, and acts as an antiparasiticide directly.

Pure carbolic acid has been recommended, but is suitable for recent cases only, and chrysarobin or one of the above methods is preferable. Light scarification, with subsequent application of a solution of corrosive sublimate, as in treatment of erysipelas, has much to recommend it, but the danger of an erysipelas is a serious objection.

The subcutaneous injection of a bichloride solution of 1 to 40 injected into the margin of the patches—two in a small patch, and four or five in a large patch—each injection containing four or five drops, and repeated every four or five days, is recommended by Dr. Moty, of Paris. The results have been very favorable. This method of treatment is based upon the idea that the disease is parasitic, and that the organisms are deeply seated—a view that is in accord with the conclusions from my own bacteriological and histological studies.

Brisquet has lately recommended the following treatment, which I have so far found to be beneficial: The hair is cut short, the scalp is not washed, but the hair is disinfected frequently with a concentrated solution of carbolic acid and the patches treated with ol. cinnamomi (Chinese) 1 part, ether sulph. 3 parts. This produces slight redness, and the application is renewed, when the inflammatory symptoms disappear. The preparation excludes air, and is antiparasitic. Humidity is avoided by not washing the scalp.

After the organisms have been destroyed, or the hairs cease to fall out, a stimulating application to bring more nourishment to the small hairs should be used. A good one is that recommended by Wilson: Liq. ammon. fort., chloroformi, ol. sesami, āā ℥ ss.; ol. limonum, ʒ ss.; sp. rosmarini, ad ℥ iv, applied once or twice a day. Crocker recommends hydr. perchlor., two to five grains; sp. vini rect., ʒ j; ol. terebinth., ʒ vij; to be rubbed into and around the patch night and morning.

Many other combinations of antiparasiticides have been recommended, but the enumeration of the above will serve as a basis for the reader. The loose hairs at the margin should always be extracted, to allow the better penetration of the drug employed. The successful treatment is an antiparasitic one in the broadest sense of that term, and includes the use of both direct and indirect agents, as good nutrition, general and local, the production of an acute inflammation, and the use of chemical antiparasiticides, of which corrosive sublimate, iodine, and chrysarobin are the best. I have not mentioned those methods that have been shown to be unreliable, as electricity, etc.

FOLLICULITIS DECALVANS. (A. R. Robinson.)

Within the last few years particular attention has been given by French authors to certain forms of disease, the expression of a folliculitis and perifolliculitis, which result in destruction of the hair-follicles and the production of a permanent alopecia and scar-tissue formation. Our knowledge of the cause of the folliculitis in the different cases so far studied is very imperfect, so the nomenclature employed has been of necessity that which was supposed to define the pathological condition; therefore each writer, according to his wisdom, has coined a new term, the sum of which has caused despair to every humble reader seeking knowledge of this new group of diseases.

The group of diseases—for there is probably more than one disease included under the different names employed—is characterized by: 1. A follicular and perifollicular inflammatory process of varying intensity and character; 2, complete destruction of the hair papilla, causing permanent alopecia; 3, ulterior formation of a scarlike tissue; 4, tendency of the lesions to agminate. The folliculitis usually affects the hairy parts of the head, scalp, and beard, but may also appear upon the other hairy parts of the body. The names which have been used by the different authors to designate the pathological condition are as follows: *Folliculites et périfolliculites agminées destructives du follicule pileux* (Brocq); *folliculite épilante* (Quinquaud); *folliculites et périfolliculites décalvantes agminées* (Brocq); *alopécie cicatricielle innominée* (Besnier); *acné dépilante cicatricielle* (Besnier); *acné décalvante* (Besnier, Lailler, Robert); *lupoid sycosis* (Milton, Brocq); *ulerythema sycosiforme* (Unna).

According to Ducrey and Stanziale (Giornale Italiano delle Malattie Ven. e della Pelle, 1892), the affections may be divided into two groups. The first is characterized by inflammation of the hairy regions of the face, chronic in course, and extending in time into the temporal regions, with final complete destruction of hair-follicles and papilla and atrophy of the skin. The other group is characterized by rapid alopecia of the hairy scalp and a peculiar atrophy of the skin. There is scarcely any sign of inflammation in this group. In the first group the process frequently begins as vesicles or pustules limited to the hair-follicles. In the second group the folliculitis is very slight, or, as in Quinquaud's disease, there are often purulent points to be seen. This division is not absolutely correct, as some of the forms—as, for instance, the *folliculite épilante* of Quinquaud may occur upon other parts than the scalp.

A study of the various authors shows that the different affections may for present utility be grouped into three varieties, following in greater part the divisions made by Brocq: 1. A mild folliculitis without pustulation; 2, folliculitis with formation of small pustules; 3, suppurative folliculitis of the beard. The first corresponds to the *pseudo-pelade* of Brocq, the second the *folliculite épilante* of Quinquaud; and the third to what was called *lupoid sycosis* many years ago by Milton, and later also by Brocq. To these three varieties Brocq adds as a fourth variety the *dermatitis papillaris capillitii* of Kaposi. I will devote a special description to this form of eruption, as it is doubtful if it belongs to the above group of affections.

Folliculites et périfolliculites agminées destructive du follicule pileux of Brocq, and *alopécie cicatricielle innominée* of Besnier, refer to the whole group of affections. *Acné décalvante* of Lailler and Robert, and *folliculite épilante* of Quinquaud, are identical. *Lupoid sycosis* and *ulerythema sycosiforme* are similar. *Acné décalvans* of Besnier is related, although not identical, with *folliculite épilante.* *Acné dépilante cicatricielle* of Besnier is the same as *acne varioliformis* of Hebra and *acné pilaire* of Bazin. *Folliculitis decalvans* is employed by Brocq as a general term for all the affections, and in this sense I have employed it. I will now proceed to describe the three varieties of folliculitis decalvans, or *alopecia innominée*, acknowledging beforehand my indebtedness to the writings of the French authors.

Pseudo-pelade, Simple Folliculitis Decalvans.—This variety at first sight looks very much like alopecia areata. The disease commences as a folliculitis or perifolliculitis, but the inflammatory process is often so mild as to be recognized with difficulty. There are light tumefaction and a light rosy tint, sometimes quite marked, of the scalp around the affected follicles. The hairs are easily extracted, and if not removed fall out later spontaneously. The hairs of nonaffected follicles are normal, and firmly seated. When the hairs fall out the inflammation subsides, but leaves atrophy of the papillæ and scalp. The extracted hairs have a glossy sheath, which is thickened and extended. The hairs are not twisted, swollen, or broken. Where bald patches result from the process the skin appears white, smooth, or almost smooth, ivorylike, atrophied, and often depressed. The patch is irregular in shape, and is either devoid of hair or there are a few scattered hairs either normal, or changed as above described. Pustules do not appear in this variety. The disease spreads to the neighboring hairs in an irregular manner, not as in alopecia areata, but by sending out prolongations into the healthy tissue. In some cases the lesions are grouped in the scalp as irregular patches. There is a slight inflammation around each hair, giving a reddish color limited to the perifollicular area, which redness soon disappears, leaving atrophy and a white depressed cicatrix. There may be several isolated patches scattered over the scalp, so that the course of the disease may be studied at one observation. The condition is diagnosed from alopecia areata by the pinhead-sized folliculitis lesions, the slight perifollicular redness, the irregular margin of the patch, and the atrophy of the skin.

Folliculite Épilante of Quinquaud.—The second form, the acné décalvante of Lailler and of Robert, is a localized folliculitis, usually suppurative in character, causing atrophy of all the constituent elements of the derma. It is most frequently met with upon the scalp, but may occur in the beard, axillæ, or pubes. The follicular lesions vary in character according to the nature of the inflammation, but the typical one is a small pustule, pinhead in size or smaller, and perforated by a hair which is easily extracted. The hair soon falls out spontaneously, and the follicle is rapidly destroyed. Sometimes there are little crusts, resting on a red base, which is moist, or there may be only a red follicular elevation. There are neither tubercles nor favus crusts nor seborrhœal appearances present. An alopecia is the first thing noticed in this disease, and it begins in isolated points around hair-follicles. The lesions are few in number and isolated, and never unite to form indurated masses as in sycosis. Successive crops of these lesions occur from time to time. The process causes destruction of all the tissues of the derma and permanent alopecia with scar-tissue formation. The alopecia patch is depressed, and has a pseudo-cicatricial appearance. It is not exactly circular, but irregular in form, about the size of a twenty-five-cent piece, and disseminated here and there over the scalp. They are smooth, polished, white, and may show redness at some points.

At the periphery of a patch, or in islands of healthy hair within a patch, small pustules perforated by a hair are usually to be seen.

Another form of this affection, according to Quinquaud, is sometimes seen—a simple atrophic alopecia, characterized by disappearance of the pilo-sebaceous glands—a pseudo-cicatricial state, without redness or erythema; the hairs fall out or are easily removed with sheaths, showing only a few epidermic scales at the base. Sometimes the alopecia is disseminated, in some places the hairs grow again, and in others the glands are destroyed. The whole process is a chronic one, giving atrophy without folliculitis. Lailler calls the first form *acné décalvante.* Quinquaud found micrococci organisms on the surface of the skin which by inoculation cause destruction of hairs in animals, but do not give all the lesions of the disease. Besnier objects to the use of the term folliculitis for the condition, as he thinks the inflammation is too superficial, that there is no elevation above the surface of the skin, and that at most there is only an epifolliculitis. He calls the condition *alopécie innominée.* Fournier states that he has seen similar lesions in cases of hereditary syphilis.

The treatment is wholly empirical, but as the disease is probably parasitic, a solution of corrosive sublimate or some other antiparasitic agent can be applied.

Besnier describes, under the term *alopécie cicatricielle innominée*, a case differing from a classical case of *folliculite épilante* in the continuous and chronic character of the disease, in the superficial suppuration and more decided atrophic changes, and in the absence of recurring acute attacks. History of the case: The whole posterior part of the scalp, from a bald spot of alopecia senilis on top of the scalp to the temporal regions, is thickly set with patches of alopecia of irregular size and form, spreading in a serpiginous manner, leaving a smooth, firm, depressed alopecia area as a result of the process. The margins of the patch are ill defined and merge gradually into normal skin. Between islands of healthy skin and the center of the atrophied patch the scalp is irregularly reddened, with an occasional hair broken at the level of the surface, and with little collections of pus in the hair follicle orifices. Besnier thought this case was an example of Quinquaud's disease, but the latter states that it is not an example of his folliculite épilante.

Under the term *alopécie cicatricielle de la barbe; acné dépilante et cicatricielle*, Besnier has described some cases which he and his colleagues were unable to class satisfactorily. In one case reported the patches showed complete alopecia with irregular margins and a scar surface with elevations and depressions, containing several hairs of normal color, bent in different directions and generally broken at the level of the surface. The hairs were more or less adherent, but could be extracted without pain. At the periphery the lesions had the same characters and showed no sharp line of demarcation, and formed small, fine elevations, very slightly scaly and always situated around a hair. In another case the depressed center of the patch had a pinkish color. The lesions at the periphery by their union formed a sinuous line, which line, upon close examination, showed a series of small, yellowish-white spots, penetrated or not by a hair. Outside of this zone there was a large number of slightly elevated follicular lesions traversed by hairs deviating in all directions.

Besnier has also described a form of cicatricial alopecia, like in favus, secondary to a perifollicular pustule, while on other parts of the scalp and head patches of ordinary alopecia are found.

Lupoid sycosis has already been referred to under the term sycosis.

It must be admitted that while we are under great obligations to Quinquaud, Besnier, Lailler, Robert, and Brocq for their careful studies of cicatricial alopecia connected with certain forms of folliculitis, we are far from being able as yet to classify these affections with any degree of satisfaction. In the present paper I have endeavored, after careful reading of the discussions at the Hôpital Saint-Louis, and of published articles by the French authors, and some personal experience, to give the reader some absorbable light upon the subject.

DERMATITIS PAPILLARIS CAPILLITII. (A. R. ROBINSON.)

Synonyms: Acne Keloid or Acne Chéloïdienne (Bazin); Sycosis Capillitii (Rayer); Sycosis Frambœsia (Hebra); Dermatitis Papillomatosa Capillitii.

This form of eruption was first minutely described by Kaposi under the above term. Its exact nosological position is not yet definitely settled, and it is probable that it does not represent any definite disease. Brocq classes it with the other forms of folliculitis decalvans. According to Kaposi it has nothing to do with syphilis, neither is it primarily a folliculitis, but an idiopathic inflammatory affection which commences usually in the back of the neck, at the junction of the nucha and scalp, and afterward spreads by peripheral extension toward the vertex, to which part it may be limited. It commences as pinhead-sized, isolated tubercles, which afterward become closely crowded together and later develop to the formation of larger papillomatous, granulation tissue growths, which bleed easily, are covered with crusts, and produce a stinking secretion which exudes between the papillæ. Occasionally small abscesses form, which more or less destroy the pathological tissue.

Pain may be present or absent in the part. In the course of years the exuberant granulation tissue gives place to contracted scar tissue, which appears in the form of keloidal or flat or depressed scars, upon which the hairs are arranged in tufts in some places, while bald patches occupy the rest of the affected area. The hairs are atrophied, crooked, easily broken, and difficult of extraction. The tubercles creak when cut with a scalpel and show many bleeding points. In some cases the papillomatous character is slight. The secretion from the granulation tissue is always a mucoid one and never purulent. Some cases have been described (Sangster) of tumor formation the size of a pigeon's egg, elevated half an inch above the surface, and warty in character, as examples of this affection, but Hilliaret considered such a case as a papilloma the result of irritation.

Anatomy.—I have examined one case which bore the closest resemblance to a papilloma from irritation, yet corresponded anatomically with the description given by Kaposi. According to this author, the lesions consist of a highly vascular papillary growth having a granulation tissue-like structure. In the later stages of existence contraction occurs, the tissue becomes sclerosed, and the hair-follicles atrophied. A few hairs collected in groups may be present in places. The epidermis is somewhat hypertrophied, the papillæ are enlarged, and there are great distention and enlargement of the blood-vessels. The corium shows marked round-cell infiltration.

Etiology.—The eruption may occur at any age and in either sex.

Diagnosis.—It must be admitted that lesions similar to those described by Kaposi may have an origin from various causes and represent accidental features of other diseases, as eczema and sycosis, or the direct result of irritation from different agents. To justify, therefore, the diagnosis of a dermatitis papillaris capillitii, the course and history of the lesions must be the principal guide, and these are given above. In uncomplicated folliculitis (sycosis) there would be no such hard, sclerosed tissue with tufts of hair in places, as the primary condition would be a suppurative folliculitis. Ordinary verruca would not be so firm, or increase in size in the above-described manner, or become sclerosed. Personally I am not inclined to the view that the condition described by Kaposi and others represents a special disease.

Prognosis.—The condition is said to have no effect upon the general health; that the disease shows no tendency to spontaneous recovery; that it is very rebellious to treatment and liable to recur.

Treatment.—As the disease shows no tendency to spontaneous recovery, and as the pathology is still unknown and mild treatment ineffective according to present experience, and the result of the process is scar-tissue formation and permanent alopecia, the treatment hitherto recommended is justifiable—namely, scraping with a curette, or excision, or destruction with caustics or galvano-cautery. Whatever method is followed, the base must be destroyed, or there will be a recurrence.

CONGLOMERATE SUPPURATIVE PERIFOLLICULITIS.

(A. R. Robinson.)

Under the term *périfolliculites suppurées et conglomérées en placards*, Leloir (Ann. de Derm. et de Syph., 1884) has described an eruption which usually appears upon the back of the hands and buttocks, but is not limited to those parts of the body. The subject has been further studied since the first publication of Leloir by Duclaux, Quinquaud, and Pallier, but our knowledge of the subject is still very incomplete. Two forms of the disease have been described. One (Leloir) form, the ordinary one met with, is characterized by rapidity of evolution and benign character; the other, by its subacute character, slow course, and rebelliousness to treatment.

Symptoms.—In the ordinary form the eruption at its commencement appears as a protuberance of the skin, resembling somewhat a slightly flattened macaroon, elevated two to five millimetres or more above the surface, and having a diameter from that of a silver five-cent piece to that of a silver dollar or even more. The lesion is usually round, rarely somewhat oval; the margins are pretty sharply limited, rarely irregular; the color is reddish, wine-color, sometimes even violaceous and bluish. If the surface is examined, especially after removal of the crusts, it is seen to be sometimes smooth, sometimes slightly mammillated, but never papillomatous. It is cribriform, like a real skimmer, from the presence of a number of orifices varying in size from that of a large pin point to that of a small pinhead. Many of these orifices are obstructed by a yellowish plug of hardened pus. Hairs are rarely to be seen. Besides these orifices there is a large number of yellowish points, the size of a grain of sand or a grain of millet, which afterward resemble the former, and from which pus can be squeezed out. Later these orifices become larger—as large as the head of a pin—and slightly ulcerative. If these lesions are pressed upon, a large quantity of pus can be squeezed out.

In a more advanced stage, and in certain forms to which Leloir gives the name phlegmonous or anthracoid, a slight fluctuation can be made out, and upon pressure pus from one or two orifices may gush out for some distance. In the slight anthracoid forms the pus is often slightly sanious in character. The hairs are healthy and easily removed, being neither broken nor friable. There are scarcely any local subjective symptoms; only slight itching and tension. There are no constitutional symptoms or fever, and never any secondary infection of the lymphatic glands. The lesion is usually single; sometimes two exist, rarely three, and very exceptionally there may be several. The disease develops quickly, reaches its acme in about eight days, remains stationary from eight to fifteen days, and then if properly treated disappears in about twelve days, sometimes sooner and sometimes later, depending upon the size of the lesion and acuteness of the process. In one case, badly treated and which lasted six weeks, Leloir found the lesion became slightly papillomatous. There is no slough or core present, or consecutive ulceration; usually the affection heals without cicatrices, or, if any are present, they are very superficial. Often a livid violaceous or brownish color remains for some time after the disappearance of the disease. The manner of commencement of the disease is not well known. According to the history of patients, it appears to commence sometimes as a slight diffuse redness of the skin, with formation of small pustules and slight itching; at other times as small, red elevations, more or less grouped, which soon form a patch. In one case there was a certain morphological resemblance to trichophytosis barbæ. Occasionally the suppurative process is limited in extent, and the part upon palpation gives the sensation of fluctuation. Leloir calls this an anthracoid or phlegmonous variety. A rare form is that in which the surface of the patch assumes a papillomatous appearance.

Anatomy.—Examination of sections by Leloir showed that the process was one of conglomerate suppurative perifolliculitis, first of the hair-follicles and later of the sebaceous glands—a perifolliculitis which may become deep or phlegmonous, or produce a papillomatous growth. Leloir found micrococci, especially in the neighborhood of the vessels, and particularly near those of the glands of the skin. The micrococci were single or double, and in some places united in groups to form zooglea masses. Inoculations of cultivated organisms caused a serious general condition or local inflammatory lesions, but nothing similar to the primary lesions. The etiology of the affection is not known. As regards prognosis, this is favorable, both as to the general and the local phenomena. There are no general symptoms, and the local reaction is slight. Under proper treatment the disease disappears in a few weeks.

Treatment.—According to Leloir, local treatment only is necessary. A simple antiseptic ointment to protect the part, and squeezing out the pus by digital compression once a day, with subsequent washing to keep the part as clean as possible, suffice. Incisions or scarifications are useless, and epilation is also unnecessary.

According to Quinquaud and Pallier (Pallier, Des périfolliculites suppurées agminées en plaques, Thèse de Paris, 1888), there is a variety of this disease in which the inflammatory process takes on a phlegmonous or carbuncular character and runs a more chronic course and is more difficult to treat. This may be called the phlegmonous or anthracoid variety. It is not as yet well understood. In it staphylococci pyogenes albus enter the sebaceous glands of the skin and aid in causing the peculiar inflammation. It approaches somewhat in character parasitic sycosis, but is not contagious or inoculable. It has been met with most frequently in persons who come in contact with animals, and is favored by traumatism and constant irritations.

These authors describe three other clinical varieties—a papillomatous, a pseudo-ulcerative, and a serpiginous and virulent form. In the *papillomatous form*, which resembles an anatomical tubercle, the lesion has a longer existence than in the two acute forms, and the surface shows granulations and irregularities.

In the *pseudo-ulcerative form* the disease is tenacious, suppurates for a long period, shows no tendency to heal, and is liable to return.

The *serpiginous and virulent form* may appear as such suddenly or as a transformation of the ordinary form, and is characterized by its peripheral mode of extension, which is without order or method. This form is evidently similar to the tuberculosis verrucosis cutis of Riehl and Paltauf.

It is clear that this subject requires further study, especially as regards etiology, for evidently two or more diseases have been described under this comprehensive name, one of which is tuberculosis cutis in one or more of its forms.

SYCOSIS. (A. R. Robinson.)

Synonyms: Sycosis Barbæ (Celsus); Mentagra (Plenck); Dartre Pustuleuse Mentagre, Herpes Pustulosus Mentagra (Alibert); Folliculitis Barbæ (Koebner); Acne Mentagra; Lichen Menti.

Definition.—According to the ordinary view of sycosis, the disease may be defined as an acute inflammatory affection of the hair-follicles of those parts of the body provided with large hairs, as the beard, axilla, pubes, eyebrows, etc., the eruptions being characterized by the presence of pinhead to pea sized, or larger papular or pustular lesions, each lesion being or, having been perforated by a hair.

This form of disease was formerly called non-parasitic sycosis, while the term parasitic sycosis was used to denote a folliculitis of the beard caused by the fungus of ringworm. This latter condition, which differs in etiology and clinical symptoms, should never have received the name sycosis, as it has led to much confusion among those not specially versed in dermatology; the term tinea trichophytina barbæ, or tricophytosis barbæ, should be used. As sycosis, however, is an acute inflammatory affection, and the process usually a suppurative one, it follows that the direct exciting cause must be one or more of the many kinds of pus organisms, hence a parasitic disease, and therefore the term non-parasitic sycosis is not correct. Whether it was proper to describe it as an absolutely non-contagious disease in contradistinction to trichophytosis barbæ is, from our present knowledge of bacteriology, no longer a question for discussion; but from a clinical standpoint the affection is practically non-contagious.

The disease may be defined as an inflammation of the hair-follicles and perifollicular tissue, caused directly by pus organisms, or organisms closely related to them. As hairs are present over almost the entire external surface of the body, and the follicles, wherever they are situated, may become invaded and inflamed by these organisms and produce a folliculitis not to be distinguished, either from a clinical, or pathological, or etiological standpoint, from what has always been described as a sycosis, a little consideration of the subject will show that the use of the term sycosis for a suppurative folliculitis of large hairs is merely a clinical convenience; and this must not be forgotten when discussing the subject. Some writers have restricted the term sycosis to a folliculitis of the bearded part of the face, but the majority include all parts of the body, except the scalp, that comprise the so-called hairy parts. As the structure of the hair-follicles is similar over the whole body, it seems to be better to call any distinctly pyogenic folliculitis, wherever seated, a sycosis, and according to the region affected a name to designate the seat be added, as sycosis barbæ, s. capillitii, s. pubis, etc.

Symptomatology.—As every inflammatory process varies in intensity in different cases according to the agents acting, the duration of action of the agent, and the vulnerability of the tissue being acted upon, so the lesions in sycosis vary somewhat in appearance in different persons, and even in the different follicles of the same region in a single individual. If the hair-follicle is comparatively small and the inflammation of a mild grade of intensity, the lesion may appear as a small papule perforated by a hair; or, if the follicle is a large one and the inflammation mild, there will be a large papule or small tubercle; but if the inflammation is intense and the suppurative process marked, large or small pustules will be present. If the suppurative inflammation extends to the immediately surrounding tissue, lesions like small boils form.

The primary eruption in sycosis consists of large or small papules, or pustules, or, as is usually the case, of both papules and pustules, the latter usually predominating in numbers, especially in the acute stage of the disease. Upon the hairy parts the eruption is most frequently seen upon the bearded part of the face. Sometimes it occupies the entire beard area, but usually only a part of it is affected at a time. It may be limited to the upper lip, or to the side of the chin, or to a small area in the submaxillary region. The order in which the other hairy parts are affected as regards frequency is, first the eyebrows, then the scalp, the axilla, and last the pubes.

The following description of sycosis will especially apply to the disease as it occurs upon the face: The folliculitis is rarely a primary condition, being usually preceded by a surface catarrhal dermatitis. Besnier and Doyon call a folliculitis situated above the place of entrance of the sebaceous gland into the hair-follicle an eczema pilaire, and when the folliculitis is below that point a sycosis. When sycosis appears upon the upper lip, and especially when it commences there, it is almost always preceded by a nasal catarrh, and is directly caused by injurious agents contained in the discharge from the nose, which produce first an ordinary eczematous eruption, and this is followed by a folliculitis. When in this situation, the eruption is usually limited in extent, occupying often an area not more than half an inch in diameter, and is very chronic in its course.

Sycosis of the beard is frequently ushered in with rather severe local symptoms, being preceded or accompanied by a feeling of heat, smarting, and a painful pricking sensation, with swelling of the affected parts. Occasionally, although rarely, the local inflammation is accompanied by swelling of the lymphatic glands of the neck, the result of secondary infection from the hair-follicles. Usually the eruption is more subacute in its symptoms at the commencement, and, instead of the simultaneous appearance of a large number of rapidly forming suppurative folliculitis lesions, there is only a limited number of isolated and disseminated or more or less grouped lesions upon a certain area, which reach their acme of development more slowly.

The eruption makes its appearance in the form of papules or pustules varying from that of a large pinhead to that of a pea in size. Usually there are more pustules than papules in an acute case, but during subsidence of the eruption there may be more papules and slightly developed pustules than well-marked pustules. If several lesions unite, a nodule is formed.

In acute cases, and with the first outbreak of the eruption, the lesions are more or less numerous, and generally seated near each other; but in chronic cases they are fewer in number, and usually isolated. In the latter there is generally considerable infiltration of the skin, on account of the coexistent eczematous inflammation. The eruption of a single outbreak rarely occupies a large area, and subsequent attacks are not necessarily upon the same place. During the course of the disease there are frequent severe outbreaks of eruption, with the symptoms above described of an acute attack, at variable intervals of time; but in the period between these attacks new papules and pustules are constantly forming and running their course. If the hairs are large, and all the follicles of an area, say, the size of a ten-cent piece or larger are affected, an abscess may result from coalescence of the pustules and liquefaction of the interfollicular tissue. I lately saw a case which commenced as an ordinary sycosis, in which half a dozen neighboring follicles were inflamed; in three or four days the pustules united at the base, giving a hard, nodular mass, as in an early stage of furuncle formation, and in a few days later pus oozed from the separate hair-follicle orifices, giving the clinical characters of a carbuncle. In many cases of sycosis furunclelike lesions are present upon the back of the neck.

The papules or tubercles in sycosis are reddish in color, somewhat conical in shape, and generally slightly elevated above the general surface. They afterward usually become pustules, and hence the disease is called a pustular inflammation of the hair-follicles. Each papule or pustule is perforated by a hair. (See Fig. 6 of Plate.) The rapidity with which the lesions become pustular varies in different individuals, in the various outbreaks of the eruption in a single individual, and in the separate lesions of a single patch of eruption. The size and number of pustules vary in different cases and at various stages of the disease in an individual case. In hair-follicles of equal size the more favorable the ground for pus organisms the larger the pustules, and the more acute the attack the greater the number of pustules present as a rule. When the ground is very favorable for the organisms the lesions often acquire the size of a pea or even larger, and their life duration is much longer than usual. If the hair be extracted early, and the pus allowed to escape to the free surface, the part heals without visible scar formation or permanent alopecia; but if the pus collects deeply in the corium, and the suppurative process destroys much perifollicular tissue and the hair papilla, scarring and permanent partial alopecia result.

If the hairs in a pustular sycosis are not shaven or the part washed, the pus, after reaching the surface, dries to form crusts, which are generally thin and isolated, seldom forming thick crusts as in an impetiginous eczema. Upon removal of these crusts a circular, funnel-shaped excavation is found, with a purulent base and a hair in the center.

Epilation during the papular stage causes much pain, but in the pustular stage the hairs are easily extracted. If not removed artificially the ever-increasing accumulation of pus around and within the follicle, and its subsequent movement to the free surface, finally expel the hair, and the part heals, as a rule, without permanent alopecia. Sometimes the inflammatory process is so severe and extensive that complete destruction of the normal tissue, including the hair-follicles and sebaceous glands, occurs, and scar-tissue formation results. This occurs in the so-called lupoid sycosis. Such conditions, however, rarely occur, and usually the worst result, even in cases of long-continued sycosis, is a partial permanent alopecia, with slight pitting from scar-tissue formation. This also is not a frequent result, and in the majority of cases, if the process is confined to the follicular area, but few hair-follicles are completely destroyed.

When the disease has lasted some time upon a certain area a condition like that of ordinary chronic eczema is present: the part is red, infiltrated, thickened, and covered with more or less scales or thin crusts. When this condition exists, elevated papules or pustules are rarely seen, but pustules form in the infiltrated tissue, and the pus, reaching the free surface, becomes dried up, forming brownish or yellowish crusts perforated by hairs. On removal of these crusts circular, funnel-shaped excavations are seen, each perforated by a hair, if the latter has not been extracted in removal of the crust. In severe chronic cases the cheeks become irregularly swollen, thickened, and covered with crusts, or are scaly or weeping as in ordinary eczema.

It is rare for the inflammation to occur simultaneously in all the follicles of an affected area; usually only a few are affected at a time, and, in my experience, usually the more deeply seated ones.

The disease is usually a chronic one, in a clinical sense, lasting weeks, months, or years, and is prolonged and aggravated by successive acute attacks occurring at irregular periods, while during the intervals or subacute stage new lesions in limited numbers are constantly forming. In sycosis of the upper lip the eruption frequently remains confined to a small area for weeks or months, the rest of the face remaining free. Here the eruption rarely shows pustules, but resembles closely that of a chronic eczema, showing thickening with scaling and exudation upon the free surface.

When the lesions are isolated and no eczema is present, the inflammation is limited to the follicle and perifollicular tissue, but usually an eczematous condition is present in the surface interfollicular tissue, which renders the skin more vulnerable and a far more favorable ground for the exciting agents of sycosis. In cases of long standing an eczematous condition is always present.

The area occupied by a single outbreak varies at different times; it may be very limited or occupy an entire cheek or even more. In chronic cases often only a few pustules make their appearance here and there.

The lesions of sycosis are generally isolated, but sometimes are closely seated and accompanied by inflammatory infiltration into the skin and subcutaneous tissue. This occurs only when the part is provided with numerous hairs, or in acute attacks in which there is much circulatory disturbance.

When the beard is allowed to grow and the natural course of the lesions not interfered with, crusts are always present in the pustular stage; but if the part be frequently shaved or washed, their formation is interfered with; in other respects, however, the symptoms of the disease remain the same. Papules, tubercles, or pustules will be present, and their perforation by a hair the more easily recognized. When the hairs are fine, isolated lesions are present instead of tubercles and deep infiltrations. In rare cases granulation-tissue formations appear on the surface in the form of papillomatous vegetations, the lesions being elevated, red, easily bleeding, and having a moist surface, from which a mucoid secretion exudes, which dries to thick or thin crusts. This condition is found especially in the depression between the lower lip and the chin.

Lupoid Sycosis.—In some cases of sycosis the process is much more destructive and the clinical symptoms are somewhat different from those above described, resembling in many ways what is observed in some cases of lupus vulgaris, and on this account Milton, many years ago, described this form under the name of lupoid sycosis. Lately it has been described by Brocq under the name *sycosis lupoïde*, and by Unna under that of *ulerythema sycosiforme.*

In 1877 (New York Medical Journal) I described the anatomical condition of the skin in a case of this form then under my observation. In these cases the destructive process is much greater than in ordinary sycosis, there being usually complete destruction of all the skin, including the sebaceous glands and hair-follicles of the affected area, causing atrophy and scar-tissue formation. The inflammation in these cases starts at one point and spreads peripherally either upward or downward, usually downward, with a narrow infiltrated margin. The perifollicular lesions may be papular, vesicular, or pustular, accompanied with great infiltration of the skin and subsequent destruction, followed by scar-tissue formation. When the inflammation is not acute the symptoms are said to be more like those in erythematous lupus, with the exception that an occasional pustule is present. It commences on the cheek and the course of the disease is very chronic, spreading very slowly, requiring months or longer to reach the scalp, where it produces complete alopecia of the part invaded. After a time the disease may cease, to subsequently reappear upon the same cheek or upon some other part. As long as the disease is progressing, pustular lesions are found at the periphery. The diagnosis of a sycosis is made upon the pustular folliculitis nature of the primary lesions. It differs, however, from sycosis in the tendency to centrifugal extension, and is probably a special disease. In one of my cases there was also present a folliculitis of the hair-follicles of the back of the neck. In Fig. 4 of Plate XXVI is represented the eruption as it appeared in a mild case lately under my care.

When sycosis is present in the eyebrows it may exist alone or with a blepharo-adenitis, or a sycosis or eczema of the face. When upon the eyelids or in the axilla or on the pubes it is usually associated with an eczema of the same region. As regards the axilla, it occurs in persons who sweat considerably in that part, or who scratch much to relieve itching there. Upon the pubes and labia folliculitis is frequently present, and is usually indirectly caused by scratching to relieve itching. In this part large or small abscesses frequently form, showing a connection between furuncle and sycosis.

Upon the scalp an extensive sycosis is rare and is almost invariably associated with an eczema of the affected area, but isolated lesions of folliculitis are often observed. I have found them to be located usually near the forehead and to consist of isolated lesions, having a short life duration, and to be caused by a serous more frequently than by a pustular exudation, but the process, nevertheless, often causes complete destruction of the hair-follicle. (See Fig. 2 in Plate XXVI.)

Besnier and Doyon regard the folliculitis so frequently observed in the nares as an eczema pilaire, but I am satisfied that a deep folliculitis is often present.

Under the head of diagnosis, folliculitis of other parts of the body will be described.

Diagnosis.—I have described sycosis as a folliculitis characterized by the presence of acute inflammatory, papular or pustular lesions perfo-

DESCRIPTION OF

PLATE XXVI.—SYCOSIS.

Fig. 1.—Inflammation of hair-follicles of the anterior surface of the forearm.

Fig. 2.—Inflammation of hair-follicles of the scalp.

Fig. 3.—Inflammation of hair-follicles from outer aspect of the thigh near the knee.

Fig. 4.—Severe folliculitis of the beard (lupoid sycosis).

Fig. 5.—Comparatively mild folliculitis of the beard.

Fig. 6.—Suppurative folliculitis of the beard — usual form of coccogenic sycosis.

PLATE XXVI.

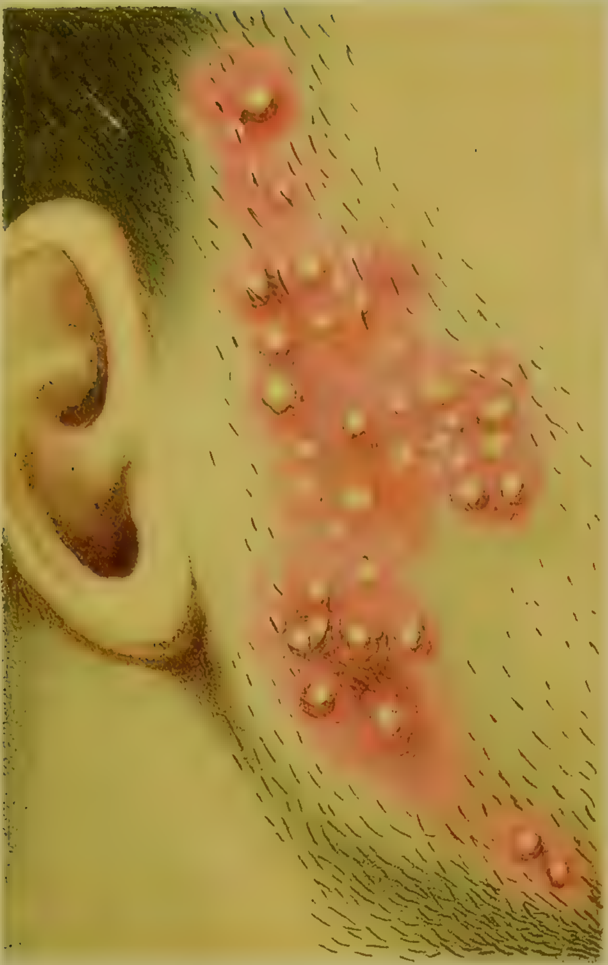


Fig. 4.

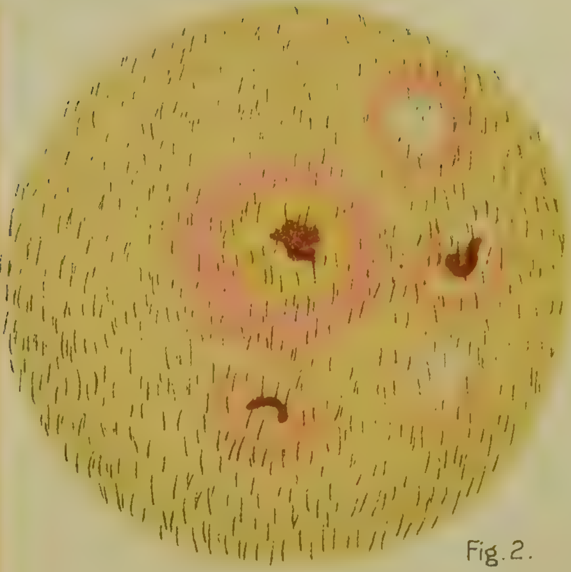


Fig. 2.

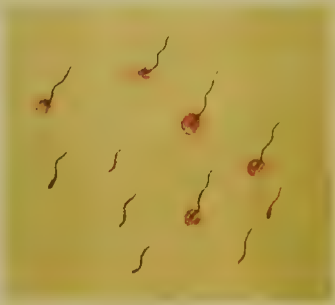


Fig. 1.

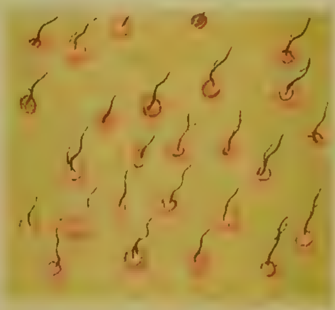


Fig. 3.

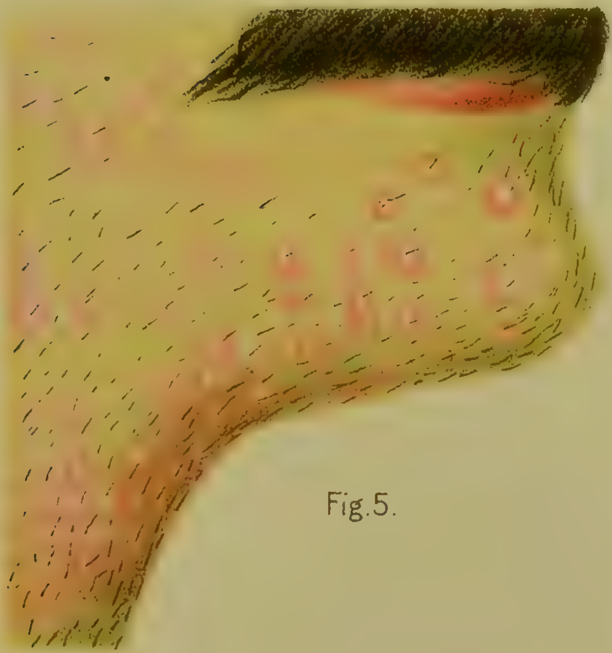


Fig. 5.

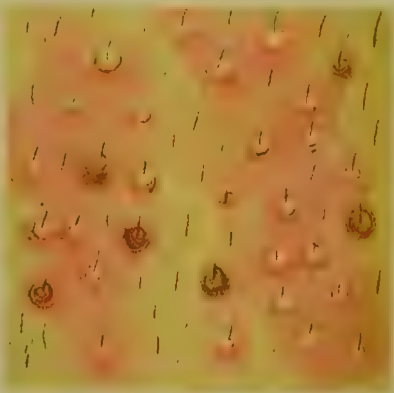


Fig. 6.

Sycosis (Robinson).

rated by a hair. The presence of such lesions, however, does not necessarily prove the existence of this disease. A few pustular lesions perforated by hairs may be present in an ordinary eczema of the beard, and yet the diagnosis of sycosis would not be made, any more than the diagnosis of acne vulgaris in a classical case of rosacea because a few acne lesions are found. Furthermore, in acne vulgaris, eczema, and syphilis many of the lesions are often perforated by hairs. The disease requires to be diagnosed from eczema, acne vulgaris, syphilis, and trichophytosis barbæ.

If papules or pustules, representing an acute folliculitis, constitute the only eruption, or form the greater part of an existing eruption upon the hairy parts of the body, the disease is probably sycosis.

If croton oil be rubbed into a part of the body having fine or coarse hairs, an eruption exactly similar to a sycosis, both from a clinical and anatomical standpoint, may be produced. Other agents may cause a similar condition.

In Plate XXVI, Fig. 3, is shown an eruption consisting of papular and pustular lesions, the result of an acute folliculitis caused by an application of laudanum, tincture of aconite, and soap liniment to the leg. The lesions were isolated, the interfollicular tissue was normal, and every lesion was perforated by a hair. The whole clinical picture was like that in sycosis. In Fig. 1 are seen inflammatory lesions, each perforated by a hair, from a person who had an eczema upon another part of the body. The lesions were upon the forearm, and every dermatologist, I think, would have called the eruption an eczematous one, yet the lesions clinically and anatomically were similar to papular lesions of sycosis of a hairy part. The isolated lesions at the periphery of a patch of scaly or creeping eczema are often papular or pustular folliculitis lesions and perforated by hairs. In ordinary eczema of the beard, papules and pustules perforated by hairs are usually present in greater or less numbers. In that case and in the other examples quoted above, the lesions are correctly regarded as part of the eruption—as eczematous papules and pustules situated at the hair-follicle seat. If that be true, then the same or similar lesions without a surface catarrhal dermatitis (ordinary eczema) would still be eczematous lesions. In Plate XXVI, Fig. 5, is represented a portion of the face of a young man upon which there are a large number of isolated acute, inflammatory lesions, pinhead in size or larger, and mostly situated in a hair-follicle area, as a hair penetrates the majority of the lesions. In some the exudation is serous in character, in others sero-purulent or purulent; they are therefore similar in character to lesions seen in eczema upon other parts of the body, and yet the nature of the inflammation and the seat of the lesions are similar to what is present in sycosis of the beard.

In many cases there is so much surface catarrhal dermatitis associated with the folliculitis that the diagnosis between eczema and sycosis can not be made with positiveness. Perhaps an ordinary eczema was the primary condition and the folliculitis secondary, or *vice versa*.

The lesions then in sycosis correspond in clinical characters and anatomical seat with lesions present in cases of ordinary eczema, and hence sycosis does not represent a special disease, a clinical entity, but is similar to those inflammations of hair-follicles met with on other parts of the body, either alone or in connection with a surface catarrh.

There are several distinct diseases of the skin in which the lesions are the result of an eczematous (catarrhal) inflammation, as ringworm, scabies, seborrhœal eczema, etc., which study has shown to depend upon special etiological factors and to have peculiar clinical features; but under the name of eczema there are still included different diseases, which later must receive special names. The use of the term sycosis, however, to a folliculitis of the hair-follicles of only a part of the body is not a scientific arrangement, but merely a clinical convenience. The term eczema pilaire for an inflammation of the follicle above the entrance of the sebaceous gland, and sycosis for a deeper inflammation, is too sharp a distinction, for such a diagnosis can rarely be made. For reasons given above, I would, as already mentioned, suggest the term sycosis for an acute pyogenic inflammation of the hair-follicles of any part of the body.

In acne vulgaris the lesions are not confined to the hairy parts, but appear also on the forehead, cheeks, nose, shoulders, etc. They are usually more superficial, and are seldom perforated through the center by a hair.

A papular syphilide is recognized by concomitant lesions, the arrangement of the papules in groups or lines, the absence of pain, and, above all, by their slow development and long life duration.

In parasitic sycosis—so-called ringworm of the beard—the folliculitis is usually preceded by a red, itching, or scaly spot of ringworm eruption. When the fungus passes down into the follicle the inflammatory process causes the formation of large or small tubercles, which arise without the pricking or burning sensation present in sycosis. The trichophyton fungus does not produce a suppurative process; hence pustules perforated by hairs are rarely seen and only as a complication. The hairs are early affected, becoming brittle, loose, and easily extracted in part. The affected area is much indurated, and the tubercles are much larger and firmer than in sycosis. When several tubercles lie near each other they form a large, irregular, indurated mass, with sharply limited margins; the surface is uneven, fissured, studded with loose hairs; the base is firm, broad, and lies deep in the subcutaneous tissue. In doubtful cases the microscope should be used.

Pathology.—Sycosis is a follicular and perifollicular inflammation of the skin, and the changes are those met with in ordinary vascular tissue inflammation caused by pus organisms. Transuded serum penetrates the hair-follicle, and as the inflammation proceeds and the pus and serum increase in quantity the follicle becomes more and more injured, the sheaths become softened and more or less destroyed, and a part of the pus may enter the follicle through the injured sheath.

After rupture of the follicle sheaths, or even before that, the exudation enters the follicle, and the hair root is infiltrated with a sero-purulent material. In the pustular stage the hair root and its sheaths are broken up and separated from the follicle sheaths, so that the hair lies more or less loosely in the follicle, and the follicle sheaths and perifollicular tissue are more or less destroyed. The hair papilla usually escapes destruction, hence permanent alopecia is rare in sycosis.

In lupoid sycosis, and in cases of permanent alopecia, the follicle sheaths and hair papilla are destroyed, and are replaced by scar tissue.

The sebaceous glands may become affected, and in severe cases the gland may be completely destroyed. The sweat-glands usually escape, but there may be a hydroadenitis. In lupoid sycosis there are destruction of all the glands of the affected area as well as of the connective tissue, and healing by scar-tissue formation.

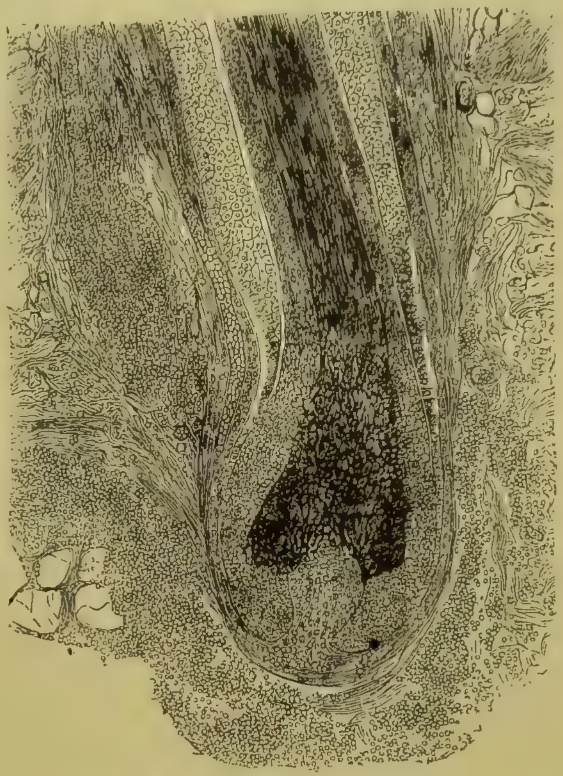


Fig. 96.—Early stage of folliculitis.

Pus-corpuscles are present in great numbers around the fundus of the follicle, and the follicle sheaths and external root sheath are partly broken down. Toward the neck of the follicle the inflammatory changes are much less in degree.

In folliculitis of so-called non-hairy parts the hair-follicle is not liable to be destroyed. In cases of what has been called eczema pilaire the inflammation is also around the lower part of the follicle, as shown by the section represented in Fig. 97.

Etiology.—If all suppurative inflammations depend upon a vital agent—one or more of the pus organisms—it follows that sycosis must depend upon the presence of pus organisms. In 1887 Bockhart made a careful study of the subject, and states that the same organisms that cause sycosis also cause furuncle and impetigo, and that these organisms were the staphylococci pyogenes cereus and albus. Tommasoli described a bacillus as being also an occasional exciting factor. My own studies, covering a good many cases, showed the presence of the staphylococcus pyogenes aureus as well as cereus and albus. Attempts at inoculation by rubbing cultures of the organisms into the skin frequently failed to produce any folliculitis, and showed the necessity for a favorable ground. The direct exciting agent, however, may not in all cases be a pus organism, but some of the agents that produce ordinary papular or vesicular eczema, and pus organisms finding a favorable ground form a complicating factor, and hence the presence of so many pustules, just as an eczema with serous exudation may become one with a purulent exudation from the presence of pus organisms. It is to be remembered that organisms like those found in sycosis are always present in the skin, and yet are rarely capable of producing an inflammation, as sycosis, furuncle, etc., are not frequent diseases.

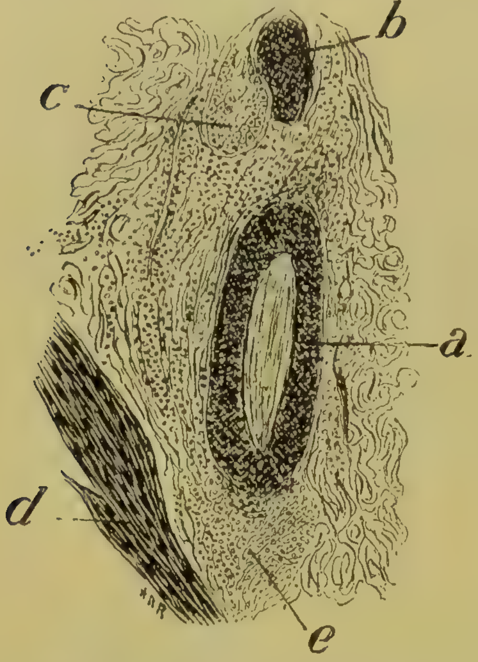


Fig. 97.—Section of a lesion of folliculitis of the forearm, showing round-cell infiltration around the lower part of the fundus, as in sycosis.

a, root sheath; *b*, part of another hair; *c*, sebaceous gland; *d*, arrector muscle; *e*, round-cell infiltration.

Let us consider these pus organisms and endeavor to value their significance in this disease, admitting beforehand, for the sake of argument, that they are the directly exciting factors of the disease. These pus organisms are almost omnipresent; every person is practically about equally exposed to them; the slightest wound of the skin will suppurate if not kept in an aseptic condition; and yet sycosis is a rare disease. Why does not every person have at all times an acne, furuncle, or sycosis? There must be other factors of more importance from a therapeutical standpoint than these omnipresent organisms. In this disease, as in many other affections due to organisms, there are other factors, so-called predisposing factors, those which make the ground favorable for the organisms, which seem to me to be of much more importance than the directly exciting agents. This holds true particularly in those diseases due to organisms of general distribution, such, for instance, as those causing suppurative inflammations. Take, for instance, an acne vulgaris. Those who are carried away by the present bacterial wave think the organisms all-important, and the only treatment necessary a local antiparasitic one, the condition of soil being of no importance. Now, in such cases it is impossible to keep the face free of pathogenic organisms, and as the life duration of a single lesion is short, the most successful treatment is that directed to the prevention of the formation of lesions—that is, treatment directed to removal of the predisposing factors, whatever they may be, whether local, or in digestive tract or genital system. Sycosis is another example. Now, in the case of such diseases—diseases depending directly upon pus organisms say, organisms to which the skin of every one is constantly being exposed and yet but few are injured thereby—the condition of the ground must be as much a factor in the causation of the disease as is the special organism. It is maintained that the organisms are essential to the production of the disease; that without them there can be no sycosis; to which I reply, that if the ground is not favorable the organisms can be present in great numbers and yet no sycosis exist; consequently in these cases one factor alone can not produce the disease, no more than a single individual can produce offspring. A spermatozoön is not more essential than an ovum. Seed may be strewed upon the earth, but if other conditions are not present—a suitable soil and proper heat and moisture—there will be no growth. And so with disease: there are factors just as much entitled in many cases to be considered essential factors as the directly exciting one—in fact, are the primary factors. The importance of this view of the case is evident in many diseases outside of dermatology. Why is it that one case of scarlatina or pneumonia or smallpox is severe and even fatal, and another mild? The organism is always a definite and similar one, even if it varies in virulent powers at different periods of an epidemic; consequently it is not a question of the kind of disease (or organism) the patient has, but rather the kind of patient the disease has attacked, and an appreciation of this fact gives the best results in treatment.

The predisposing causes in sycosis are similar to many of those in ordinary eczema, such as hereditary vulnerability of skin; all conditions which lower the nutritive condition; all injurious agents, whether acting mechanically, chemically, or thermically, as some soaps, acids, dirt, heat from furnaces, the rays of the sun, etc. There are examples of trade eczema and there are cases of trade sycosis. Disorders of the intestinal tract, as catarrhal or acid dyspepsia, gout, overacid condition of the system, substances remaining in the system from incomplete proteid oxidation, can make the ground favorable for a sycosis. The disease upon the hairy parts usually occurs between the ages of twenty-five and fifty.

Prognosis.—The natural duration of the lesion varies greatly, sometimes lasting only a few weeks, and in other cases months or even several years. The larger the lesions the greater the danger of scarring and permanent alopecia. Recurrences are frequent. If the occupation of the patient plays an important part in the causation, the prognosis is unfavorable unless the occupation is changed.

Treatment.—As sycosis is to be regarded as an acute inflammatory affection caused directly by vital agents, organisms acting upon a ground made favorable by predisposing factors acting directly or indirectly, three things are to be considered in the treatment, namely, the predisposing factors, the circulatory disturbance, and the parasitic agents. Under Etiology I have considered the nature of the predisposing factors, and in so far as they are known they should receive proper consideration. If it be the occupation of the patient, or a digestive disturbance, or a changed blood constitution, they should receive due attention. If the ground is made favorable by irritation and injury from any kind of soap or other injurious agent, the part should be protected against such injury, and only a non-irritating soap used for washing, especially in those persons in whom there is a hereditary vulnerability of the skin. If it be correct that those subject to sycosis have an eczematous disposition, an alkaline treatment is advisable. Usually it is sufficient for such persons to avoid acids and everything that is injurious in cases of acid dyspepsia. Disorders of the digestive tract and gouty conditions should receive proper treatment. Those things which interfere with oxidative processes in the system, as alcohol, tea, coffee, wine, beer, etc., should be avoided. In all cases where there is lowered nutrition or a specially favorable ground for the organisms, tonics and cod-liver oil are indicated. I regard the latter as absolutely necessary where the lesions are large and tend to have a chronic course. It is one of the best anti-pus-organism agents.

As regards the treatment for the circulatory disturbance, that will depend upon the character of the inflammation and the vulnerability of the skin. Sycosis is clinically a chronic disease, lasting months or years, but histologically it is an acute inflammation no matter how long it lasts, as the disease is kept up by the continuous formation of new acutely forming lesions. In an acute inflammation there is more blood passing through the inflamed part in a given unit of time, the blood-vessels are dilated, and there is an increase in exudation and emigration into the surrounding perivascular tissue. The indications, therefore, are to use such agents as will counteract as far as possible the pathological process—agents that will reduce the caliber of the blood-vessels, and thus diminish the acute hyperæmia and lessen the exudation and emigration and reduce the intensity of the inflammatory process. Astringents in some form are always indicated, but it must not be forgotten that every astringent, when used in a concentrated form, is a caustic, an injurious agent, one that will intensify instead of reduce the inflammatory process. The more acute the inflammation the milder should be the astringent employed. The vulnerability of the skin also varies in different persons, hence the more vulnerable the skin the weaker the preparation or the milder the drug to be employed. Combinations of tannic acid, oxide of zinc, acetate of lead, black-wash, etc., are indicated, according to the theory above stated. Zinc or tannic acid are milder astringents than lead preparations, and should be employed in very acute cases. The strength must also be regulated according to the intensity of the inflammatory process—the more intense the process the milder the application. In a subacute stage stronger astringents can be employed; and when the disease has lasted a considerable time and the inflammation is deeper than in an early stage, astringents whose action extends a distance into the tissues, as lead, should be used.

Before the days of bacteriology, all treatment was aimed directly at the inflammatory process, and lotions and ointments were prescribed to correct the circulatory disturbance and remove inflammatory exudation. Hebra treated sycosis with diachylon ointment alone, and used no antiparasitic agent and no internal treatment. Now many have gone to the opposite extreme, and recognizing organisms as the direct cause of the inflammation, employ only direct antiparasitic agents—agents which kill organisms in a test tube. In some inflammatory affections, such as ringworm of the body or an eczema of the head from pediculi, the circulatory disturbance is not to be considered, and antiparasitic treatment is the only kind necessary, but in sycosis the inflammatory process and the nature of the ground are to be seriously considered. The parasitic agents are also important, and antiparasitic measures must be combined with the antiphlogistic ones. Among the antiparasitic agents which have been employed with more or less success in sycosis, I would mention corrosive sublimate, salicylic acid, boracic acid, sulphur, iodoform, tar, and beta-naphthol. All these substances are injurious if used in too concentrated a form; and here also, as with the astringents, the intensity of the inflammatory process and the vulnerability of the skin regulate the strength of the application.

The principles of treatment, therefore, are: 1. The avoidance of all external irritating or injurious agents of whatever kind, whether solutions, ointments, soaps, or what not; 2, avoidance of irritation from within, proper diet, correction of any dyscrasic condition, and avoidance of those things which hinder normal oxidative processes within the body, as tea, wines, ale, etc.; 3, antiphlogistic measures, astringents, etc., to regulate circulatory disturbance; 4, antiparasitic agents to destroy the organisms causing the inflammation.

Whether the face should be shaved or not is a matter of dispute. Shaving keeps the hair short, and enables the local applications to reach the inflamed tissue; but it also causes more or less irritation or injury to the inflamed part and produces erosive places elsewhere, making the ground more suitable for the pus organisms, and thus favoring the formation of new lesions. It is better, I believe, to keep the hair short by cutting it with scissors. As regards epilation, the loose hairs should be extracted, as it assists drainage; but if the hairs are firmly seated, they should not be removed, as the extraction causes much pain and injures the follicle tissue. These views are based on the belief that everything that injures the tissue favors the pus organisms. Crusts can be removed by sweet oil, poultices, or vaseline. All large abscesses should be opened by incision or curetting, to reduce inflammation and save hair papillæ, and avoid scarring. The face may be washed daily with warm water and a superfatted thymol, or corrosive sublimate soap. If ointments are used, they should be spread on strips of linen firmly applied and changed twice a day.

If the disease is acute, with much swelling, cold water with a little bicarbonate of potassium added should be constantly applied, or bran water, or a weak lead and opium wash, or, what is very good, blackwash. These should be used until the very acute stage is passed, when a mild astringent and antiparasitic ointment should be employed. Lassar's paste or boric acid, twenty grains to an ounce of rose ointment, or tannic acid ten to twenty grains to an ounce of vaseline are of value in the receding stage of an acute attack. Usually we have to treat cases in a less acute stage—what can be called a subacute stage—and for this many forms of ointments are recommended. Iodoform, sixty grains to an ounce of vaseline, is useful, but the smell is objectionable. Lassar's paste, with two-per-cent ichthyol, or the diachylon ointment of Hebra, made with vaseline, gives good results. Brooke recommends hydrarg. oleatis (two per cent), ℥ j; ichthyol, ♏xx; acidi salicylici, gr. x.; Rosenthal, acid tannic, gr. xlv; sulph. precip., gr. xlv; zinci oxidi and amylum, each ℥ ss; and vaseline, ℥ j; Jamieson, hydrarg. sulphureti rubri, one part; sulphur, twenty-four parts; and vaseline, seventy-five parts. An ointment of corrosive sublimate, a half to one grain to an ounce of zinc ointment and ten drops of carbolic acid, I find of decided service, as it meets the indications. The strength of the mercurial can be increased if the inflammation is chronic. Another useful ointment is the following: Ung. hydr. ammoniat., ʒ ij; calomel, ʒ j; bismuth subnit., ʒ ss; ungt. zinci. oxidi, ʒ vj. I have seen cases do well with a combination of salicylic acid and zinc ointment. The yellow oxide of mercury with vaseline is useful when there is marked suppuration. Naphthol two per cent, sulphur ten per cent, zinc oxide ten per cent to an ounce of vaseline, may be employed in subacute cases.

In chronic cases, with a subacute process and considerable thickening of the skin from exudation, the above remedies should be used in greater strength, so as to have a slightly stimulating effect. The parts should be washed daily and the ointment then applied. The addition of oil of cade, twenty to sixty drops to an ounce of Lassar's paste, or a mercurial or sulphur ointment, aids as an antiparasitic and absorbent remedy. The more chronic the process the more tar can be added, but it must be carefully watched, lest the inflammation be intensified by its action. A combination of tar ointment and zinc ointment, equal parts, is usually a safe and valuable application. Tar in alcohol is recommended by Pick.

Internally the sulphide of lime is recommended during all stages of the disease, from its supposed favorable action in suppurative inflammation. In the chronic stage Donovan's solution is of service, probably from the so-called alterative action of the combination.

Sycosis of the upper lip is usually more a surface eczema than a folliculitis, and is best treated by the ointments recommended for the chronic stage of sycosis.

In this paper I have endeavored to make the grade of inflammation the guide for the strength of the astringent and antiparasitic applications to be employed, and only when the reader keeps this in mind will he have success in treating sycosis.

D. DISEASES OF THE NAILS.

ONYCHAUXIS. (Arthur Van Harlingen and E. J. Stout.)

This term, which is derived from the Greek words *ὄνυξ*, *a nail*, and *αὔξειν*, *to increase*, is used to denote any hypertrophy or increase in the substance of the nail, whether this consists in a simple thickening of the corneous tissue, or in a general enlargement of the whole substance of the nail, with associated changes in the shape, color, and composition, or texture.

In the first variety the nail becomes excessively hard and heavy, misshapen, opaque, grayish-white in color, glossy on the surface, and curved, often considerably so, so that the borders of the nail show a pronounced tendency to turn downward at the sides or over the end of the finger. In the second variety of hypertrophy of the nails the growth may mainly manifest itself laterally, and then there is produced the common condition known as **ingrowing nail**, chiefly encountered on the toes; or the increase may manifest itself longitudinally, and there is produced that fantastic distortion of the nail substance known technically as **onychogryphosis** (from *ὄνυξ*, *a nail*, and *γρυπός*, *curved*) or **curved nail**. These nails, often so twisted and rolled upon themselves as to resemble the familiar ram's horn, present a color varying from a grayish or dirty-yellow to a brown, are glossy, and are traversed both longitudinally and transversely by striæ or ribs. On the under surface they are dark brown in color, marked by depressions or fossæ, between which run well-defined ridges. Frequently—and this mainly in the case of the toes where this condition is most apt to be found, especially the great toe—there will be found an accumulation of softened and foul-smelling epithelium, the nail from the matrix to the tip being three inches or more in length.

Etiology.—Onychauxis may be either congenital or acquired, the former occurring in combination with congenital hypertrophy of the fingers, or associated with ichthyosis, papillary enlargement, or congenital syphilis. The acquired variety is much more frequent, and may be due to traumatism, lack of cleanliness, with the presence of parasitic fungi (trichophyton fungus), unrestrained growth (onychogryphosis), as seen in certain races (Chinese), or in bedridden, paralytic, and elderly people; the involvement of the nail and matrix in chronic inflammatory processes, such as elephantiasis arabum, chronic eczema, lichen ruber, psoriasis, etc.; obstructed circulation, as from the pressure of tight shoes; or it may occur symptomatically as a sequel of degenerative or irritative neuropathic affections, such as neuralgia, chronic myelitis, spontaneous neuritis, trauma of the mixed nerve trunks ("glossy skin"), etc.; or with anchylosis, chronic articular rheumatism, or diseases of the bones.

Symptoms.—In those rare cases in which the trouble is located in the nails of the fingers not only does cosmetic deformity result, but there is to a greater or less degree a loss of tactile sense; so that there is utter inability to perform fine work of any kind. In the case of the toes there is experienced more or less difficulty in walking, or locomotion may be altogether impossible. Growth in the lateral direction gives rise to pain, inflammation, swelling, and ulceration of the adjacent soft structures—in fine, all of the manifestations of ingrowing toe nail.

Diagnosis.—The diagnosis of onychauxis is simple. Examination of the nail affected will at once make patent the cause of the patient's complaint.

Prognosis.—This will vary according to the cause in each individual case. If it is consequent upon neglect, uncleanliness, or inflammatory processes secondary to chronic skin affections, removal of the cause will be followed by an amelioration or cure of the condition. If dependent upon lepra or elephantiasis or extreme traumatism, removal of the nail alone will end the condition.

Treatment.—This consists primarily in the removal of the cause, whatever it may be. This should be followed by excision of as much as possible of the hypertrophied tissue by the knife, or cutting pliers, or, if the nail is excessively hardened and thickened, the saw must be employed.

If the lateral increase should have reached that degree known as ingrowing toe nail, the offending shoe should be replaced by one of greater width, the nail should be softened by immersion in warm water, and then scraped thin in the center to favor retraction of the edges. The unhealthy granulations should be destroyed by some cauterizing agent, as silver nitrate or acid nitrate of mercury, the sharp edge of the nail having been previously cut away. The raw surface should then be covered with lint wet in water or sweet oil, covered with oiled silk, and pressure applied, a portion of the dressing having been pushed between the nail and the skin to prevent further downward tendency of the former.

In some severe cases the only treatment that will avail will be complete avulsion of the nail. Recently there has been proposed a method of treating severe cases of ingrowing toe nail by splitting the nail and removing the ingrowing edge together with that portion of the matrix from which it springs, thus doing away with complete avulsion of the nail. The plan of treatment suggested by Scott-Battam is an excellent one. The parts having been washed and dried, the granulations are painted over with a cocaine solution, and then thoroughly rubbed with the solid nitrate of silver. Small pieces of fine Turkey sponge are then pressed in between the nail and granulations, and pressure applied. By this means a sulcus is formed between the nail and the granulations, and on the removal of the crust resulting from the application of the silver nitrate a healthy ulcer will be left. The edge of the nail may be cut away on the fourth or fifth day, a thick coating of iodoform added, and the sponge compresses applied as before. This dressing may be employed for three weeks if desired, by which time the condition will probably be corrected.

If onychauxis is due to the presence of psoriasis or eczema, appropriate applications must be made, while internally iron, arsenic, and other suitable remedies may be administered. A valuable ointment recommended by Crocker is one composed of salicylic acid, ʒ ss. to ʒ j to the ounce of lanolin cum oleo. This is spread upon linen strips and applied with some pressure to the affected nail. If the skin should begin to peel, the ointment may be laid aside for a few days. Oleate of tin, gr. xx to ʒ j to the ounce of lard, is recommended by Shoemaker for these cases. Where there is a specific history, or a suspected taint of syphilitic infection, in addition to the regulation specific treatment internally, applications may be made to the part of powdered iodoform, mercurial ointment, or corrosive sublimate solution, 1 part to 250 parts of water.

ATROPHIA UNGUIUM. (Arthur Van Harlingen and E. J. Stout.)

Synonym: Hypoplasia and Aplasia Unguium, seu Onychatrophia.

Anonychia—absence of the nails—or atrophy of these organs, may be congenital or acquired. In the congenital form the phalanges of the fingers and toes will be frequently found to be in an imperfect state of development and associated with absence of hair. Usually the condition is acquired, and may involve the entire nail or only a part thereof; it may also be due to a local or systemic cause. This condition is characterized by deficient development or growth of the nail substance, which appears grayish-white in color, lusterless, thinner or smaller than normal, resembling a thickened membrane, soft, brittle, or easily bent and crumbling. Occasionally the texture of the nail substance is so soft that it may become exfoliated longitudinally, and may split in its thickness, giving an uneven appearance to the nail, which assumes an irregular shape when parts of it are loosened; it may also become granular and look "worm-eaten." Severe cases of ulceration may be followed by more or less complete destruction of the matrix of the nails; in such cases only a small, degenerated, rudimentary nail, or no nail substance whatever, is formed; the entire nail-bed is then covered by a dry, resistent, horny mass, which is partially renewed, and assumes the character of the cutis.

Etiology.—As local causes of this disease may be mentioned traumatism, which in some instances may be followed by hyperplasia, in others by aplasia. Ill-fitting shoes exert pressure on the nail and push the nail-bed upward, thereby interfering with its activity and giving rise to a thin nail-plate. If marked antero-posterior pressure is exerted simultaneously, the function of the matrix is partially interfered with, and complete suspension of the nail growth may follow. A direct blow, a contusion of the nail, etc., may also interfere with the nail formation (Geber).

Extreme degrees of cold, freezing of the fingers and toes, may be followed by complete stasis of the nail growth. Furthermore, the continued use of strong acids, alkalies, coloring matter, etc., will deleteriously affect the nails of those who habitually work with these agents.

Inflammations accompanied by formation of pus, and ulcerative processes in particular, will also give rise to complete arrest of the nail formation.

Atrophy of the nails may also be due to fevers, or may occur in consequence of any chronic systemic diseases, as scurvy, malign neoplasms, scrofulosis, syphilis, caries, and necrosis of the bones, etc.; it may also be due to tuberculosis. Furthermore, the affection may be dependent on neurotic conditions due to disease or injury. Certain skin diseases, as eczema, psoriasis, leprosy, ichthyosis, may also be followed by an atrophic condition of the nails.

Treatment.—When the nails are deformed, twisted, exfoliated, or stumpy, and in consequence interfere with the patient's daily occupation, it is necessary to trim them frequently, and protect them from injury with a coating of wax. The next step will be to remove the causes of the defective nail growth. All injurious external traumatic, thermic, and chemical influences must be carefully avoided. When the condition is dependent on dyscrasia, nervous affections, inflammations, and ulcerative processes, these must be properly treated. In those cases due to impaired nourishment or deficient blood supply, the administration of quinine, iron, and other tonics is indicated. When deficient nail growth is the result of grave febrile affections, it is not necessary to resort to therapeutical measures, as the affection will improve with the increasing strength of the patient. Unna suggests the application of strips of adhesive plaster, so as to exert even pressure on the nail, thereby facilitating its growth and giving the nail a correct shape.

In the condition known as "glossy skin" (Weir Mitchell, Injuries of Nerves and their Consequences, Philadelphia, 1872; Moorhouse and Keen, Gunshot Wounds and other Injuries of the Nerves, Philadelphia, 1864), due to neural lesions depending on disease or injury of the nerves, the hair on the fingers usually disappears, and the nails become much changed in appearance. The nails are only affected on the fingers whose nerve supply has been disturbed. They become curved in the longitudinal and transverse direction, and sometimes the cutis is thickened beneath their extremity. In some cases the retraction of the skin of the third finger joint occurs, and the sensitive matrix is partly exposed. Simultaneously the upper line of union of skin and nail retreats into or under the latter part, and, in place of a smooth edge, is seen through the nail as a ragged and notched border. In rare cases the nails of the toes may be attacked; the curving, however, is less marked, but a painful ulceration is apt to occur at their angles. Eichhorst (Centralbl. f. klin. Med., 1893, No. 14) records a case of congenital absence of the nails on all the fingers in a mason and zither-player, aged twenty-six, who did not experience any inconvenience whatsoever from the absence of these organs. The nail-bed and nail-matrix were well developed; the proximal ends of the former appeared shiny, smooth, quite red, and were provided with a soft, delicate membrane, which was thicker at the distal ends. The nail-beds were shortened in height, and their anterior ends were situated one centimetre from the point of the nail phalanx; these somewhat resembled drum-beaters' fingers. The hair and teeth were perfectly normal in development. In this case the nail formation probably ceased in the third fœtal month. No other members of the family were affected thus.

ONYCHIA OR ONYCHITIS. (Arthur Van Harlingen and E. J. Stout.)

From ὄνυξ, *a nail*, and the termination *itis*, *inflammation*.

Definition.—This word has been employed to designate any of the acute or chronic forms of inflammation of the matrix of the nail.

Onychia may be either idiopathic, traumatic, syphilitic, secondary, or malignant in nature, but of these, that due to syphilitic infection and the malignant form, also known as onychia maligna, are of greatest import; only the latter will be considered here.

Onychia Syphilitica.—Syphilitic onychia has already been fully treated of in Vol. II of this System, under Syphilis of the Appendages of the Skin, to which the reader is referred.

Onychia Maligna.—This is an inflammation of the matrix of the nail, usually confined to one nail, and originating in some slight traumatism, such as a squeeze or a contusion. It is most commonly seen in unhealthy children, and is associated with other manifestations of the strumous diathesis. The inflammation is usually phlegmonous in nature, though commencing with the customary signs of inflammation, swelling, redness, and tenderness. The pain is of a throbbing character, and there follows an exudation of a fetid, sero-sanguinolent fluid under the nail, lifting the latter from its bed. The nail becomes greatly thickened, and is opaque and discolored; its edges roll up, and often it may be completely separated, leaving a gangrenous, readily bleeding surface, which may slowly heal and become covered by an imperfectly formed nail. Frequently, however, the inflammation extends to the adjacent tissues and develops into a fully formed paronychia, with involvement of the bone of the last phalanx. This latter condition is one of the most distressing symptoms of Morvan's disease. Occasionally the condition may become chronic.

Treatment.—If the case is a mild one, all that is required is a cold-water dressing applied to the nail, and the administration of tonics internally. In the severe forms the tension may be relieved by free incisions, together with removal of the nail. After cleansing the surface various applications may be made, as of iodoform, iodol, or some mercurial, as the ointment of the red oxide, and over this moistened boric lint covered with oiled silk. Internally, vigorous supporting treatment is indicated. Quinine in full doses, with stimulants, as port wine, a generous diet, and, if possible, a change of scene and regimen.

ONYCHOMYCOSIS. (Arthur Van Harlingen and E. J. Stout.)

Synonym: Tinea Trichophytina Unguium. (See Duhring's case of tinea trichophytina unguium, Philadelphia, Med. and Surg. Reporter, August 3, 1878.)

Definition.—This term (from the Greek words ὄνυξ, *a nail*, and μύκης, *a fungus*) is applied to the condition in which the substance of the nail becomes invaded by vegetable parasites, as the achorion Schœnleinii and trichophyton fungus.

Symptomatology.—Several or all of the nails may be attacked, and the nails of the feet may also become the habitat of these parasites. The presence of these fungi gives rise to hypertrophy of the nail tissue, which becomes softened and undergoes atrophic changes. The affected nails become brittle, furrowed, lose their color, are opaque, present a grayish, yellowish-white appearance, and are more or less elevated by a collection of epidermis beneath them.

According to Geber (Ziemssen's Handbuch der Hautkrankheiten), the nail becomes gryphotic, thickened, exfoliated on the surface, loosened in places, and turns a pale, dirty-yellow color, and frequently becomes much distorted. In rare cases the nail shows the characteristic favus lesions, consisting of sulphur-yellow, circumscribed depressions resembling scutula. Onychomycosis occurs comparatively more frequently secondarily than primarily. In those cases in which no mycotic affection of the skin can be found it would be erroneous to positively conclude that it had never existed, as the mycosis has generally disappeared before the changes in the nail substance due to the presence of the fungi become apparent. Onychomycosis is caused more frequently by the trichophyton fungus than by the favus fungus, and the variety due to the presence of the first-named parasite very rarely attacks the toe nails. The appearance of the nails when they have become the habitat of either of these fungi presents but very little difference.

Diagnosis.—As quite different affections, such as chronic eczema, psoriasis, etc., may give rise to the same clinical appearances existing in onychomycosis, it becomes imperative to examine for fungi with the microscope to make a positive diagnosis as to the nature of the affection, except in those cases in which there are characteristic lesions of these diseases present on other parts of the body, which will aid in establishing a diagnosis. If fungoid elements can be found, the diagnosis becomes certain; if they are not present, however, it must not be concluded positively that the affection does not exist. Longitudinal and transverse sections of a mycotic nail show its substance to be more or less softened, exfoliated, and thickened, with a pale-white or grayish yellowish-white mass adhering to it. This mass, when divided and treated with glycerin, which renders it more transparent, and examined microscopically, will be seen to contain reticulated filaments of mycelia and conidia and horny epithelial cells in varying numbers. Thin sections made through the entire thickness of an affected nail and placed in liquor potassæ (1 to 50) show the fungoid elements to have a more concentrical situation, from which the mycelial filaments extend between and around the nail cells in all directions. When specimens of onychomycosis are frequently examined, they may vary in appearance, the conidia sometimes predominating in great numbers, and at times they scarcely can be detected among the abundant, ramified, and segmented net of mycelia. It would appear, based on careful examinations, that not only one fungus form may exist in onychomycosis, but that several different fungoid forms may occur simultaneously in one and the same nail. The nails may also be invaded by animal parasites, such as the acarus scabiei, in the form of that disease known as Norwegian itch, and by numerous tropical muscidæ, and especially by the jigger (pulex penetrans seu rhynchoprion penetrans), also known by the name of chigoe and chigger, the sand-flea, found in the West Indies, in central South America, Africa, and the Southern States of America; its presence gives rise to severe pain, and is followed by paronychia and loss of the nail.

Treatment.—The treatment consists in removal of the nail substance by mechanical or chemical means. The diseased nail is to be filed or scraped thoroughly, or softened with repeated applications of concentrated potash in solution, or the finger nail may be bathed repeatedly with soap, soda, or potash, and followed by the application of a suitable parasiticide, as creasote, acetic acid, or hydrarg. bichlor., gr. ij–v in alcohol. Dressings consisting of sulphurous acid or hyposulphite of soda, ʒ ij to aquæ ℥ j, to be used on lint and then covered with silk, are well spoken of.

The method known as Pellizzari's may be used, which consists of applying sapo viridis to the nail and covering with rubber, and allowing the application to remain *in situ* for a few days until the nail becomes soft. Olive oil and pyrogallic acid, partes æquales, are then used, until the nail becomes loose; it should then be removed, and an iodoform dressing applied.

According to Crocker, Harrison's method for tinea tonsurans is accompanied with the best results in the treatment of onychomycosis. This process is as follows: Two solutions are made—No. 1 solution: ℞ Liq. potass., aq. dest., āā ℥ ss.; potass. iodidi, ʒ ss. No. 2 solution: ℞ Hydr. perchlor., gr. iv; spir. vini rect., aq. dest., āā ℥ ss. After the diseased nail has been thoroughly scraped the first solution is applied on lint covered with oiled silk, and allowed to remain in contact with the diseased part for a quarter of an hour; this is immediately followed by solution No. 2 on lint covered with oiled silk, which should remain for twenty-four hours; after the expiration of that time the same process is to be repeated. When the skin commences to peel and tenderness of the finger is present, hyposulphite of soda should be applied until the skin becomes thicker. This method, when employed in the treatment of tinea tonsurans, must be used with the greatest caution, and should be employed only under the direct supervision of the medical attendant.

LEUCOPATHIA UNGUIUM. (Arthur Van Harlingen and E. J. Stout.)

From λευκός, *white*, and πάϑος, *disease*.
Synonym: White Nails.

This condition is observed to occur in spots, bands, and very exceptionally the whole of the nail may be of a white color. *White spots*—to which the ancients gave the name of *flores unguium*, in Fallopius's time were called *mendacia* (lies), and known vulgarly as "gift-spots" or "lies"—are of frequent occurrence in the nails of young people. This defect is attributed to injury of the nail and to the presence of air between the nail substance. We are, however, unacquainted with the mode of their origin. Geber is of the opinion that they are produced by mechanical means, which interfere with the complete cornification of the nail cells. Picking back of the nail-fold is a common cause, and they frequently coexist with similar white spots in the teeth (Hutchinson). White spots, which occur occasionally on entirely healthy nails, point to passing changes in the site of formation of the nails. Among convalescents from malignant fevers the nails have been noticed to become white. Whiteness of the nails of a chalky hue has been observed in paralytic patients. It would appear that in some instances these spots are partially dependent on trophic changes. Transverse bands extending over the surface of the nails have been described by various authors; these bands appeared after each exacerbation of fever, as in Dr. Longstreth's case (Longstreth, Transactions of the College of Physicians of Philadelphia, third series, vol. iii, 1877), who suffered from relapsing fever, thus recording each relapse. Dr. Langdon Down (Transac. of the Patholog. Society, 1870, vol. xxi, p. 409) records the presence on the fingers and toes of a gentleman of two distinct sets of white lines extending transversely over the nails, which made their appearance after he had experienced two attacks of poor health. In this case the lines corresponded with the time of the occurrence of the two attacks. Dr. Morison, of Baltimore (Medical News, vol. li, p. 430, 1887), describes a case of transverse white bands in the nail, under the name of leucopathia unguium. According to that author, they start underneath the epidermic covering of the lunula, and grow forward until they are cut off at the free margin; the bands occurred in the case of a young lady who, although somewhat pale, had always enjoyed good health, and consisted of transverse white lines; between these the color was normal, and they extended from one nail margin to the other, and were about one sixteenth of an inch apart. The rest of the nail substance appeared entirely normal. The cause of their origin could not be ascertained. In a case of leucopathia unguium, existing in a colored boy under observation in Dr. Van Harlingen's clinic, and reported by Dr. E. J. Stout, the finger nails are marked with white spots and transverse white bands; between some of these the color is normal. Some of the nails of the toes on both feet are similarly marked. This man, aged twenty-one, has scrofulous glands on the left side of his neck. His mother died of phthisis; his father is still living. He has always enjoyed good health until last April, when he suffered from an attack of grippe. At present he is somewhat nervous and weak. It would appear, from the history, that the white bands are probably congenital in this case.

SPOON NAILS; REEDY NAILS.

In his work on Diseases of the Skin, Crocker calls attention to two conditions of the nails to which he has given these terms.

Spoon Nail designates that condition of the nail in which the latter is considerably thinned and of a concave form from side to side. The edges are everted, and there is occasionally associated an antero-posterior curvature to a less degree than the lateral. This appearance of the nail has been observed in connection with some wasting diseases, but in other instances the etiology has been obscure. The trouble begins in the nail of one finger and gradually involves the others, while the nails of the toes appear to be exempt.

Reedy Nail is the term given to that appearance of the nail in which the normal longitudinal striæ become much more prominent, the condition apparently resulting from an atrophy or wasting of the intermediate substance. Fothergill has been inclined to regard this condition of the nail as symptomatic of gout, but from the fact that the disease is very common in aged persons, and in those especially who do not present any other gouty manifestations, Crocker believes that it is simply one of the associated changes of senility. For both of the above conditions there is no therapeutic indication.

PTERYGIUM.

This word, from πτέρυξ, *wing*, is applied to the downward growth over the nail of the fold of skin, that is normally present in a slight degree where the proximal extremity of the nail is attached to the finger. The lunula is hidden by this prolongation of the epidermis. The treatment consists in loosening the skin and pushing it back, or clipping it off.

CLASS VIII.—PARASITIC DISEASES.

A. VEGETABLE PARASITIC DISEASES.

TINEA FAVOSA. (ARTHUR VAN HARLINGEN AND E. J. STOUT.)

Synonyms: Favus; Honeycomb Ringworm; Porrigo Lupinosa; Porrigo Favosa; Tinea Lupinosa; Crusted Ringworm; Ger., Erbgrind; Fr., Teigne Faveuse.

Definition.—Tinea favosa is a contagious, vegetable, parasitic disease of the skin, due to the presence of a fungus called the achorion Schönleinii, characterized by the development of discrete or confluent, small, split-pea-sized, circular, cup-shaped, pale yellow, friable crusts, usually perforated by hairs and accompanied by itching.

This affection is rare in the United States, but is met with not infrequently among the lower classes of the recently arrived foreign element in this country. According to Crocker, it is exceedingly rare in England, but common in Scotland, frequent in France, and of very frequent occurrence in Poland; it is also quite often met with in Italy, especially the southern part. Hirsch attributes the more frequent occurrence of favus among the Jews—especially the men, living in Russia, Poland, Hungary, Galicia, and the Levant, and also among the Mohammedans living in Turkey, Asia Minor, Syria, Persia, Egypt, Algiers, and Morocco—to the habit required by their religion of keeping the head constantly covered. According to that author, want of cleanliness is one of the main factors in the spread of favus and pityriasis versicolor, although the affection is always due to direct contagion.

Symptomatology.—Usually the disease is located on the scalp, but it may attack any part of the body, and even the mucous membranes.* The affection makes its appearance on the scalp as an inflammation of the cutaneous surface, either diffused or circumscribed, accompanied with slight scaling. Quite small, pinhead-sized, pale sulphur-yellow crusts form around the hair-follicles, which later develop into the characteristic sulphur-yellow cups, termed favus cups, favi, or scutula, which have a central depression, are often striated concentrically, somewhat elevated above the surface of the skin, and consist almost entirely of fungus. To those cases in which a single scutulum remains isolated and well defined, the name of *favus lupinosus* has been given. These cups, when removed, present on their lower surface a smooth, moist, convex, excoriated appearance, which corresponds to the irregular depressions and elevations of the rete, in which they are situated; they can be reduced to powder with the fingers. A depression exists in the rete, which, however, soon becomes obliterated after removal of the cup; the skin beneath the crust is smooth, shining, or, as in chronic cases, atrophied. The degree of inflammation varies, and sometimes pus is present under the crusts. In cases in which the affection has existed for a long time the surface beneath the crusts may be ulcerated. When numerous scutula have developed, their margins join and coalesce, and they retain their rounded shape only at their free margin (*favus squarrosus*). When the cups are fully developed, after the course of a few months, the characteristic sulphur-yellow color assumes a brownish or greenish-yellow appearance, due to the admixture of dust or to the application of external remedies.

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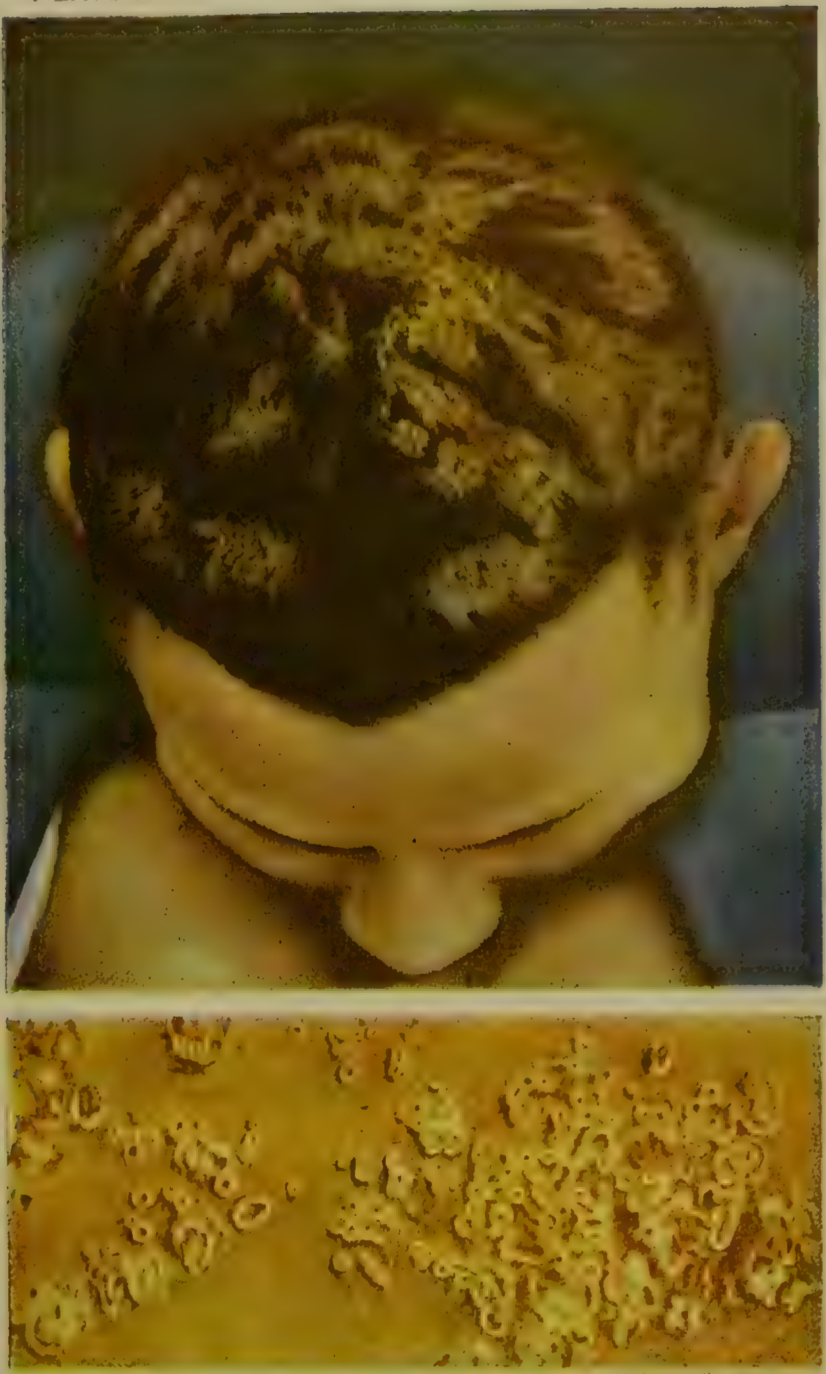
* See Kaposi and Kundrat's case, Wiener medizinische Presse, 1884.

Favus is usually characterized by more or less itching, and possesses a peculiar odor resembling that of musty straw or mice. Its course is usually very chronic, lasting for years. We have under our observation at present a girl, aged twelve, in whom the affection first made its appearance at two years of age, and has existed ever since. Cicatrization and permanent loss of hair are apt to follow a severe and chronic attack of favus. Th. Simon reports a case of atrophy of the skull in the vicinity of the parietal protuberances, following an attack of favus.

The hairs, when attacked by favus, present a dull appearance, lack luster, become thickened, dry, and brittle, and break easily, or split longitudinally, and are more easily removed than when in a healthy condition. In some cases an eruption of pustules occurs, the adjacent glands become involved, and pediculosis and eczema may coexist. The affection may be confined to a limited area of the scalp, but it frequently tends to spread over the larger portion of the scalp, and the fungus may be transplanted by scratching to other parts of the body.

As already stated, tinea favosa is an eminently contagious disease, and may exist among animals, as mice, rabbits, cats, and fowls, and numerous cases are on record in which the disease has been transmitted from animals to human beings. The disease may have its seat either in the hair-follicle or hair (*tinea favosa pilaris*), or upon the cutaneous surface (*tinea favosa epidermidis*); the follicle and hair are the favorite localities of favus; the nails may also become affected (*tinea favosa unguium*). Occasionally, when appearing in other localities than the hairy scalp, the scutula may be accompanied by the formation of vesicular rings, or patches which are scaly and round and bear a resemblance to the vesicular or macular variety of tinea circinata.

PLATE XXVII.



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TINEA FAVOSA (Chatelain).

Favus of the nails is a very rare affection, and the fungus in almost every instance is introduced under the nails by the latter scratching the scalp. The characteristic yellowish scutula are seen to exist sometimes at the free end, and at times in the more central portion of the nail; the nails have the same appearance as in *onychomycosis*, and become opaque, brittle, yellow, fissured, and traversed by irregular longitudinal and transverse furrows, appearing thickened in some places and thin in others. The fungus rarely flourishes as vigorously under the nails as on the skin and hair; its presence may be easily demonstrated by scraping the nail and examining the specimens under the microscope.

Pathology.—The spores are about $\frac{1}{3000}$ of an inch in diameter, and it has been demonstrated by numerous experiments that inoculations with this fungus will give rise to tinea favosa alone and to no other disease. The achorion Schönleinii was first discovered by Schönlein in 1839, later on by Gruby and Wedl. Remak was the first to successfully inoculate the fungus upon the arm. When examining with the microscope, a particle of the favus crust is placed in a solution of ammonia, which causes disintegration of the crust and allows the parasite to be isolated. A few drops of iodine solution in water to which potassium iodide has been added imparts a reddish-brown color to the fungus. This is seen to consist of roundish spores, either isolated or connected, occurring in the form of chains. These spore chains generally mark the terminus of the mycelial filaments. According to Cornil and Ranvier, the free extremity of the filaments of mycelium are at first spherical, afterward becoming slightly elongated, so that the filament is formed by the union of short joints. The filaments of the mycelium are composed of elongated, distinct, dotted, dichotomously ramifying, firmly united joints. The spores forming chains are very frail, and are considered as a portion of the plant in the process of germination. Upon a vertical section of the skin, through a spot covered by a favus fungus, at the surface formed by the fungus, the epidermic layers are seen to be filled with spores which are scattered between the corneous cells. With the spores are always seen micrococci and bacteria, besides small drops of fat. The accumulation of these foreign elements causes a prominence and a peripheral swelling of the fungus. The diseased center is usually occupied by one or more diseased hairs; here is where the evolution of the fungus takes place and where recovery begins. In favus fungi of considerable extent the invasion of the parasite is not limited to the epidermic layers. The mycelium penetrates perpendicularly into the derma and there ramifies. This penetration is not due to a simple pushing aside of the tissues, but to a true invasion (Malassez); the tubes of the mycelium arise from the bottom of the fungus, and pass in a straight line into the connective tissue between the fasciculi. The derm slightly reacts from this invasion, and at the surface of the fungus there is a continual exudation or even suppuration. In every case the connective tissue invaded by the thallus (or filaments of mycelium) of the achorion Schönleinii is gradually absorbed, and it is probable that this absorption causes the cicatrices which are found beneath the fungi after recovery. The fungus grows principally in the fibrous shaft of the hair between the longitudinal epidermic laminæ; here the filaments are found to consist mainly of spores, but the mycelium is found in the tunics of the hair bulb in the neighborhood of the root. The parasite of tinea favosa occurs in larger numbers and in greater luxuriance than any of the vegetable parasites. Usually the spores gain admission to the skin through the openings of the hair-follicles. According to Balzer, the achorion develops between the rete at the orifice of the hair-follicle; the superficial layers of the epidermis are firmly connected with the hair and are held down by the growth of the fungi; thus the cup shape is produced. The hair becomes affected directly or indirectly in the tunic of the root during the further progress of the disease; the achorion then penetrates through the inner and through the outer tunic of the root into the subcutaneous tissue, causing inflammation, which is followed by formation of cicatrices.

Favus of non-hairy parts (tinea favosa epidermidis) is characterized by the same development of the scutula, and generally appears as roundish spots of a bright red color. These are quite small at first, but soon grow larger, and may increase to the size of a dollar; they become elevated, and are accompanied by slight itching and scaling. As they grow larger they show a tendency to get well in the middle, and to extend with a raised margin; finally red, raised, scaly circular eruptions remain, and the skin which is surrounded by these eruptions appears fairly healthy. Occasionally yellowish matter is noticeable among the scales, and when the fungus is present in a hair-follicle yellowish cups exist. When these conditions are absent the disease may be mistaken for tinea circinata. St. Cyr (Ann. d. Dermat., vol. i, p. 282) describes an accidental inoculation with favus on his own hand, as follows: The epidermis, to the extent of a silver three-franc piece, is of a yellowish discoloration, thickened, corrugated, and split; at the margin of this circle is situated a ring of vesicles filled with clear serum, scarcely the size of lentils or peas; on close inspection the lanugo hairs are seen to be surrounded with yellowish, pinhead-sized scutula, which are slightly depressed in the center, and look as if they had been made with a needle.

Unna considers that there are three forms of favus:

1. *Favus Griseus.*—Scutulum not very large, grayish-yellow in color, not depressed in the center, with small hairs and lanugo hairs growing through it; the hyphæ travel at right angles, and grow straight outward,

and from this characteristic he would name the variety of fungus "achorion euthythrix."

2. *Favus Sulphureus Tardus.*—Scutulum very large, covering often the entire back of a mouse; it is thick and depressed in the center, and of a pale, creamy-yellow color. The hairs do not grow through it; the hyphæ branch like forks, and Unna names it "achorion dikroon."

3. *Favus Sulphureus Celerior.*—Scutulum does not grow larger than a peppercorn, and is depressed in the center. At the periphery it is of a light ochre color, getting white toward the middle, while at the margin of the depression it is often brown; the smaller hairs are pressed down, but the lanugo hairs grow through the crust, the hyphæ branch irregularly, and Unna names this variety "achorion atakton." Unna states that the depression in the scutulum is due to the growth of the fungus, and not to its relation to the hair-follicle, as it is also observed in cultures.

Diagnosis.—The diagnosis of favus is not generally accompanied with much difficulty; the small, circular, sulphur-yellow, friable, cup-shaped scutula, usually perforated by a hair, and the peculiar odor, are very characteristic. Sometimes, however, particularly in cases of long standing, the cups have lost their characteristic appearance and resemble the crusts occurring in pustular eczema. In eczema the crusts are greenish-yellow; those of favus are lemon or sulphur yellow. In eczema the crusts are tenacious and can not be readily pulverized; in favus they are dry and friable. The odor in eczema capitis, although frequently sickening, is not characteristic; in favus it is mousey. In eczema of the scalp the hairs remain intact, and are only matted; in favus they are dry, lack luster, are readily extracted, and atrophied; permanent bald patches are apt to occur. There may be some loss of hair in eczema capitis, which, however, is only temporary, and permanent alopecia is extremely rare. In psoriasis of the scalp the lesions are composed of whitish scales, beneath which the skin is slightly red, smooth, and bleeds easily. The hairs in psoriasis retain their luster, and atrophic bald spots do not exist, as in tinea favosa.

In seborrhœa the skin beneath the fatty scales usually appears normal in color and smooth, atrophy of the scalp and crusts does not occur, and the fungus of favus is not present. Ringworm can be readily confounded with favus when the favus cups have not developed, and the differential diagnosis is often very difficult; but as soon as the characteristic yellow, cup-shaped crusts form around a hair the diagnosis becomes easier.

In ringworm the spots are covered in the center with scales, and vesicles are more or less plainly visible at the periphery of the lesions, which tend to extend in this manner. The hairs have the characteristic nibbled-off appearance. Examined with the microscope, the spores in ringworm are seen to be less numerous, smaller, and more uniform than in tinea favosa. It is, however, a matter of great difficulty to establish the diagnosis of a non-typical case of favus with the aid of the microscope alone.

Treatment.—The treatment of favus must be very vigorous and persistent to effect a cure, and consists in removing the crusts and in depilation and the use of parasiticides. The hair should be cut quite short, and the scalp thoroughly soaked with olive oil and covered with a hood; after the crusts have become softened they can be removed, and the scalp should be thoroughly washed with soap and water. The affected hairs should then be epilated with forceps provided with flat blades and the parasiticide rubbed in thoroughly. Kaposi's method, consisting in grasping the hairs between the thumb and a spatula, or strong cardboard, and pulling them out, may be employed. Bulkley, of New York, uses epilating sticks, consisting of ℞ Ceræ flavæ, ʒ iij; laccæ in tabulis, ʒ iv; resinæ, ʒ vj; picis Burgundicæ, ʒ x; gummi Dammari, ℥ jss. These ingredients are melted, and shaped into sticks one half to three quarters of an inch in size. These are heated and applied to the scalp, the operator imparting a rotary motion to the sticks, and after allowing them to remain in contact with the scalp until cool are removed rapidly with the hairs adhering to them. This process is patterned after the French method, called "calotte" (or pitch cap), which is exceedingly severe and barbarous, and its use is associated with danger.

Among the numerous remedies employed in the treatment of favus a saturated solution of sulphurous acid is regarded as one of the best. Sulphur, in ointment (ʒ j–ij to ℥ j), or combined with tar; bichloride of mercury, in solution (gr. ij to ℥ j), are well spoken of. Solution of sodium sulphite (ʒ j to ℥ j) is also a good remedy. Ointments of hydrargyri sulphas flavus, ʒ ss. to ℥ j), or of chrysarobin (ʒ ss to ℥ j), used carefully, may also be employed.

The parasiticides used in tinea tosurans also answer quite well in the treatment of favus. The parasiticides must be rubbed into the scalp quite vigorously every time depilation is practiced, and their employment should be persisted in for months. They should be continued for some time after the disease appears to have been eradicated, so as to guard against the recurrence of the fungous growth.

To effect a cure of favus of the head will generally require six months. The disease can not be pronounced cured until repeated examinations at various times have been made, and the hairs and scalp should be examined carefully from time to time for six to eight months. If crusts, or round, red, squamous lesions do not form during this period, the danger of contagion may be regarded as at an end.

In favus of the epidermis the crusts should be thoroughly softened with oil, washed with soft soap, and then a parasiticide rubbed in. The treatment of this form of favus requires much less time than when situated on the scalp, three weeks being stated as the general average time required to eradicate the affection.

When the nails have been invaded by the favus fungus the disease is quite rebellious to treatment. The nail under which the fungus is situated must be rendered quite thin by filing by degrees and a parasiticide employed. Removal of the affected nail and application of a parasiticide to the denuded part is regarded as the quickest method of effecting a cure. As the disease is highly contagious, patients should be carefully cautioned to use great care to prevent the disease being acquired by other members of the family.

TINEA TRICHOPHYTINA. (Arthur Van Harlingen and E. J. Stout.)

Tinea trichophytina, or ringworm, embraces four varieties of disease: Tinea circinata (ringworm of the body); tinea tonsurans (ringworm of the head); tinea barbæ (ringworm of the beard); tinea unguium, or onychomycosis (ringworm of the nails). This latter will be considered under Diseases of the Nails. These diseases are all due to one common fungus, the trichophyton, and are considered as one and the same disease, only presenting different appearances, according to the locality in which they make their appearance.

TINEA CIRCINATA. (Arthur Van Harlingen and E. J. Stout.)

Synonyms: Tinea Trichophytina Corporis; Herpes Circinatus; Ringworm of the Body; Fr., Herpès Circiné.

Definition.—Tinea circinata is a contagious, vegetable, parasitic affection of the skin, due to the trichophyton fungus, characterized by one or several circular, inflammatory, vesicular, or squamous patches, which itch, and may occur upon any part of the body surface.

Symptomatology.—The disease usually makes its appearance in the form of a small, pale-red, circular, or irregularly shaped spot, which later on assumes a circular shape and is accompanied by scaling; or small papules or vesicles occur, which are distributed around the periphery of the patch. When the patches have attained their full development they generally assume a circular shape, are somewhat elevated, and their margins are sharply defined against the healthy skin. The name *ringworm* has been given to the disease on account of the lesions showing a tendency to heal in the center while spreading on the periphery. The annular lesions vary in size from that of a five-cent piece to that of the palm. Occasionally adjoining rings coalesce and assume a gyrate form.

Frequently there exist only one or more lesions, and these may be located on different parts of the body. Quite often the annular form of the lesions is absent, and there exists but a circular, circumscribed, scaly patch. The favorite seat of the disease is on the hands, neck, and face, but any part of the body is liable to be attacked. The patches are unsymmetrical in shape, and are wont to occur in localities where adjoining surfaces are in contact, due to the transplantation of the fungus.

The disease is also apt to attack the crotch, or axilla, and the region between the nates; when situated thus it is known as *eczema marginatum* (the more proper term would be *tinea cruris seu axillaris* [Crocker]). When these regions are involved the disease is of a more inflammatory nature than when situated on other parts of the body, owing to the fungus having found a moist soil favorable to its development. In these localities the affection shows a tendency to spread, and is less amenable to treatment.

The annular lesions which first make their appearance extend rapidly, and in a short time coalesce; the patches are well defined at their periphery, elevated, papular, and scaly, and may show a smooth, pigmented surface in the center. The lesions frequently involve large areas, sometimes spreading to the vicinity of the knees and reaching up to the navel, also between the cleft of the nates and perinæum, and usually affect the the internal surface of either thigh.

The disease, as it occurs in temperate climates, is not usually severe; its course is subject to considerable variations. Sometimes it exists for only a few weeks, and then again it may prove quite obstinate, lasting for months, and even years, and prone to relapse.

In the tropics the affection is of much more frequent occurrence and of a more obstinate and severe nature, and appears to be situated deeper. Exceptionally the nails are invaded by the fungus, and give rise to *onychomycosis*, to which we will refer later. The affection known as *tinea imbricata*, or *Tokelau ringworm*, is a disease of the tropics, and is regarded as distinct from tinea circinata.

Etiology.—Tinea circinata is due to the presence of the trichophyton fungus, discovered by Bazin in 1854, and is identical with the parasite occurring in tinea tonsurans and tinea sycosis. It is regarded as the simplest variety of tinea, and the fungus does not flourish as luxuriantly in this form as it does in the two latter varieties. The fungus is situated superficially on the epidermis in the corneous layer. The disease is of a highly contagious character, and may attack quite a number of persons living together simultaneously. It occurs among domestic animals, as cows, horses, and oxen, and may be readily transmitted from them to man. Such a case came under our notice several years ago, in which a servant whose duty it was to attend to the milking had contracted the disease from a cow. Some individuals are more susceptible than others, and it would seem that in certain persons a condition favorable to the growth of the parasite exists. The fungus, as viewed by the microscope, presents the following characteristics: The spores are circular in shape, having an average diameter of about $\frac{1}{7000}$ of an inch, and exist either singly or form chains; the tubes are less numerous than the spores. The parasite gains admission through the epidermis, and gives rise to a hyperæmic condition, and inflammation of the surface accompanied by the formation of papules, and occasionally vesicles. The diagnosis of tinea circinata is not difficult. The characteristic appearance, or the microscopical examination, will determine the character of the disease. In making a microscopical examination a very small quantity of dilute liquor potassæ should be added to the scales obtained from a lesion; the specimen should be covered with a thin glass and subjected to pressure, which will force the particles apart. A power of two hundred and fifty to five hundred diameters is required to detect the characteristic appearance of the fungus, which consists of long threads of mycelium.* The absence of the fungus, however, must not be regarded as the *sine qua non* of the diagnosis, as it is quite a difficult task in some cases of tinea to find the trichophyton.

Diagnosis.—The disease is sometimes confounded with eczema squamosum, which differs, however, from tinea circinata by not being so sharply defined and by fading gradually into the surrounding surface, and by the presence of more marked infiltration. Further, the lesions in the latter affection are more evenly distributed, the healthy areas between them are absent, and the fungus is not present.

Seborrhœa occurring on the chest and back may appear in the form of annular lesions. The scales in seborrhœa, however, have a greasy feel, the mouths of the follicles are patulous, and the fungus is absent.

Psoriasis in some cases bears a strong resemblance to tinea circinata; the lesions in psoriasis, however, are generally more abundant and usually distributed symmetrically over a larger area, and the patches are generally situated on the extensor surfaces of the elbows and knees, and the scales are more numerous, thicker, silvery, and devoid of fungus.

In favus of the body the lesions may assume a circular form, but the sulphur-yellow caps, diagnostic of favus, will soon make their appearance, and the microscopical examination will reveal the difference between the fungi of the respective diseases. In tinea circinata, ringworm of the head or beard is also apt to coexist.

From pityriasis rosea the disease under consideration is distinguished by the former affection involving a larger area and the scales being less abundant; the lesions of pityriasis rosea are also more yellow in color and show a preference for the trunk, are devoid of fungous growth, and are not contagious.

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* For description of fungus, see Tinea Tonsurans.

Treatment.—The treatment of this disease is simple, and local remedies are usually sufficient to effect a cure. In anæmic individuals, or in persons who are run down in health, tonics may be administered. Care must be exercised to thoroughly destroy all possible sources of infection from the clothes by thoroughly disinfecting the patient's wearing apparel by means of heat or boiling in hot water.

In milder forms of the disease occurring in children the affected area should be thoroughly washed with hot water and soap, and an ointment, containing sulphur or hydrargyrum ammoniatum (gr. xv–xxx to ℥ j), applied twice daily. In severer cases, washes consisting of sulphurous acid, full strength, or of sodium hyposulphite (ʒ j to ℥ j), employed as a lotion or in ointment form, will prove quite efficacious. Ointments consisting of chrysarobin (gr. x–xl to lanolin ℥ j), or of pyrogallic acid, may be employed in inveterate cases. The objection to these two remedies, however, lies in the fact that they dye the skin and clothing and may give rise to inflammation. Applications of tincture of iodine, or bichloride of mercury (gr. iij to ℥ j of water), are well spoken of when it is desirable to effect a speedy cure; the latter should, however, be used only in adults. An ointment of oleate of copper (ʒ ss. to ℥ j), and application of salicylic acid, in ointment form, in five or ten per cent strength, are also quite serviceable.

The variety of ringworm known as eczema marginatum is quite rebellious to treatment, and the more vigorous parasiticides must be resorted to in case the milder remedies fail. The affected area must receive a thorough cleansing with sapo viridis, followed with applications of a wash of sodium hyposulphite, ʒ j to aqua ℥ j.

In very obstinate cases chrysarobin (gr. x to xl to the ounce), in ointment form, may be employed; care must, however, be used with this drug, as already stated above. Whatever parasiticide is used in this affection must be used persistently, and the patient must remain under observation for some time, even when the disease seems to have disappeared entirely, so as to institute treatment at once when a relapse occurs.

TINEA TONSURANS. (Arthur Van Harlingen and E. J. Stout.)

Synonyms: Herpes Tonsurans seu Circinatus; Ringworm of the Scalp; Tinea Trichophytina Capitis; Tinea Tonsurans seu Tondens; Porrigo Furfurans; Fr., Herpès Tonsurant; Teigne Tondante; Teigne Tonsurante; Trichophytie Circinée; Ger., Scherende Flechte.

Definition.—Tinea tonsurans is a contagious, vegetable, parasitic disease of the scalp, due to the trichophyton fungus, characterized by the formation of patches, generally of circular or irregular shape, varying in size, circumscribed, vesicular or squamous, more or less bald patches, upon which the hairs are diseased and usually broken off close to the scalp.

It is of frequent occurrence in France, particularly in Paris. It is also quite common in London and in the larger cities of America. In Germany the disease is very seldom met with. Ringworm of the scalp occurs much oftener than favus or pityriasis, particularly in the tropics, where it frequently appears in endemic form. Judging from this fact, we are led to believe that the disease under consideration is favored by climatic conditions, by high temperature, and excessive moisture. This view is further strengthened by the fact that the affection increases in severity and frequency during the rainy, hot season of the year, whereas it decreases during the cold season. The cause of the frequency of ringworm occurring among the dwellers in tropical countries is attributable more to neglect of cleanliness and unfavorable hygienic surroundings than to racial peculiarities.

Symptomatology.—The disease usually commences in the form of a small, reddish, round, or irregularly shaped patch, which is covered with fine scales and somewhat elevated. The margin of the patch may be surrounded with a ring of small vesicles or pustules, which soon disappear, and end in desquamation and furfuraceous scales. Usually similar lesions may be found to exist on other parts of the scalp. The lesions extend at the periphery, spread rapidly, and soon circular, circumscribed patches appear, varying in size from a ten-cent piece to that of a dollar, and their color may be pale red, bluish-gray, or greenish-yellow, according to the complexion of the child. The affection at first involves the surface, but as it progresses the hairs become diseased, lose their luster, are dry, withered, and present a broken-off appearance. The patches often, when they retain their round shape, bear a resemblance to a priest's tonsure, which has given rise to the name *tinea tonsurans.* The hairs become quite loose and brittle, and are easily broken off when an attempt at epilation is made. Often the stumps and surface of the hairs present a grayish-white appearance, due to the presence of the fungus; the follicles of the skin look puckered, and the scalp is more or less elevated. This appearance has been compared to the surface of a goose-skin, or to that of a fowl after the feathers have been plucked. During the further progress of the disease the hairs show a tendency to split, drop out spontaneously, and temporary alopecia ensues. Often the adjoining patches coalesce and involve a larger surface, and may assume the size of the palm or hand. Any part of the scalp may be invaded by the patches; the crown and parietal region, however, are their favorite seats.

The disease is usually unattended by pain, but itching, more or less severe, is generally experienced. The lesions may extend from the head to the side of the face, giving rise to tinea circinata. Both conditions may coexist simultaneously. If left to itself the affection generally becomes chronic; it may, however, end spontaneously. This is the usual course pursued by the disease. In some unusual cases pustules are developed and form crusts, thus resembling pustular eczema.

In the form known as **disseminated ringworm** the hairs may not drop out, and seem to be normal, and the scalp presents only a scaly appearance; on close inspection, short, stumpy hairs may be noticed.

There is another variety, although infrequent, to which Liveing has given the name **bald tinea tonsurans.** In this form the disease has at its commencement the characteristic features of ringworm; later on there follows loss of hair, and the scalp presents the smooth appearance as in alopecia areata, and at the margin of the lesion the hairs take on the characteristic appearance existing in that affection. When this condition is present in all the patches the diagnosis must be determined by the presence of scales in the commencement of the disease; usually, however, the characteristic fungus of ringworm may be discovered with the microscope in the hairs around the patch. Such cases have probably given rise to the belief that herpes tonsurans and alopecia areata may coexist simultaneously, and that alopecia areata is of a contagious nature.

The condition known as **kerion** is a peculiar inflammatory and suppurative form of ringworm, and is virtually a pustular folliculitis, analogous to the condition occurring in tinea sycosis. It is characterized by smooth, yellowish, reddish, or purplish patches, more or less elevated, œdematous and boggy. These are honeycombed, and are marked with numerous yellowish points of suppuration, which are the outlets of the distended hair-follicles, deprived of their hairs, which discharge a mucoid, gummy, honeylike fluid. Occasionally itching, burning, and pain exist in these patches. In chronic and severe cases permanent baldness occurs, and it is not always an easy matter to discover the fungi with the microscope. Occasionally this condition exists in a mild form during the treatment of tinea tonsurans. Kerion usually pursues a chronic course; if left untreated it may last indefinitely; occasionally a spontaneous cure results. Frequently the disease bears some resemblance to a carbuncle, and is often confounded with the latter affection.

The same treatment used in tinea tonsurans will answer for kerion. Applications of lotions of sulphurous acid are highly spoken of.

Etiology.—Tinea tonsurans is due to the presence of the trichophyton fungus, and is highly contagious, and may be propagated directly or by the use of infected clothes, brushes, combs, or towels. Where many are congregated together, as in children's homes and schools, the disease may attack a number of children simultaneously. It is of common occurrence, as already stated, and is confined almost exclusively to children, being met with exceedingly rarely in adults. Both sexes are attacked in about equal ratio, boys being somewhat more liable to contract the disease than girls.

Tinea tonsurans often occurs in domestic animals, as horses, dogs, cats, and calves, and can be transmitted from them to human beings, and can also be inoculated from man to animals. The children of the rich and poor classes are equally liable to be attacked, and it occurs in well-nourished as well as in debilitated children; it would appear, however, that the skins of some individuals are more susceptible to attack than others. It is thought that the fungus may be propagated by the atmosphere where a number of children are living together. Frequently children contract the disease from tinea circinata existing in their parents or nurses. Gruby, in 1844, was the first to discover fungous elements in tinea tonsurans. Malmsten, of Stockholm, almost at the same time discovered and described fungi to which he gave the name of *trichophyton tonsurans.* We are also indebted to Von Bärensprung for an accurate description of tinea tonsurans. This author quotes cases of inoculation from animals to man, and *vice versa.* The fungus in tinea tonsurans affects the epidermis, the hair, and the hair-follicles. There are two views entertained as to how the fungus penetrates into the substance of the hair. According to one view, the fungus is situated at first on the normal cuticle; the mycelia containing conidia permeate the hair tunic and hair root, the fungus invades the hair, and the spore-bearing mycelia divide into segments; the entire hair, with exception of its medulla, is filled with conidia. According to the other theory, the fungus gains admission at the opening of the hair-follicle, enters between the hair shaft and follicle, pursues a downward course until it arrives at the bulb cells, and then follows the upward growth of the hair, and the hair fibers become invaded by the mycelium.

Nature of the Fungus.—The fungus is identical with that of tinea circinata; it grows very luxuriantly, and contains exceedingly numerous spores. Microscopically the hairs are seen to contain spores and mycelium, the spores greatly exceeding the latter in number, and most numerous in the corneous layer directly around the hair and also inside the hair substance. The bulb and root of the hair are invaded by immense numbers of spores. The hair presents a distended and ruptured appearance at different parts of the shaft. According to Cornil and Ranvier, the fungus is a growth formed of roundish spores, measuring about ·005 millimetres. These spores are isolated, or in groups, between the lamellæ of the epidermis. A number are cylindrical in shape, and placed end to end. Neumann, in opposition to the assertion of Ch. Robin, has pointed out in this fungus the presence of a ramifying mycelium. The parasite is ordinarily found in the lamellæ of the epidermis by scraping the surface of a tinea circinata and macerating it in a solution of potassa or ammonia. The growth of the parasite in the hair differs little from that of favus. The spores are usually abundant at the root of the hair, growing from below upward between the longitudinal fibers of its cuticle. The epidermic laminæ of the shaft of the hair are somewhat separated, in consequence of which the hair becomes brittle and breaks. Around the hair in the inner epidermic sheath the parasite accumulates, and causes an abundant formation of epidermic laminæ separated from one another by rows of spores. There then is formed a kind of white collar around the hair, projecting above the point where it emerges from the skin. The botanical position of the fungus has not as yet been definitely determined. Lowe regarded the trichophyton tonsurans as being identical with aspergillus glaucus. Neumann, however, considered it as belonging to penicillium glaucum; whereas Atkinson believed the fungus to be a mucor mucedo. Köbner succeeded in producing tinea tonsurans with inoculation of the trichophyton fungus, and inoculations with penicillium glaucum gave only negative results. Experiments, however, lead us to believe that the trichophyton is a special form of fungus, and entirely different from the fungus-producing favus; and it is a well-established fact that inoculations with the trichophyton fungus always produce tinea tonsurans.

Diagnosis.—The diagnosis in typical cases of ringworm of the head is not usually attended with difficulty. When, however, the disease presents an atypical appearance, mistakes in diagnosis are very apt to occur. When a case is unusually difficult to diagnosticate, the microscope will clear up all doubt. In examining specimens of hairs microscopically, it is necessary to add a drop of liquor potassæ to the hairs or epidermis, which are covered with the glass and viewed with a power of 250 to 400 diameters. Specimens which have been treated for hours with liquor potassæ and finely divided afford the most satisfactory view. When the epithelial crusts contain much fat, a little ether and alcohol should be used, allowed to evaporate, and then a little liquor potassæ added. It is easy to mistake the mycelium for particles of wood or cotton. Loss of hair, the presence of erythematous, scaly patches, and the characteristic appearance of the hairs, which are nibbled, broken, bent, and twisted, point to ringworm. The existence of blackish dots or stumps of hairs, located on disseminated areas partly devoid of hair, should arouse our suspicion as to the nature of the affection. As an aid to diagnosis, Duckworth's test may be resorted to. This consists of adding a few drops of chloroform to a patch and allowing it to evaporate; the action of the liquid imparts a whitish or light yellow color to the affected hairs, whereas healthy hairs remain unaffected.

The diseases with which tinea tonsurans may be confounded are eczema squamosum, seborrhœa, psoriasis capitis, alopecia areata, and tinea favosa.

In eczema squamosum the patches occurring on the scalp may resemble those of ringworm; the hairs, however, are normal in appearance in the former affection and are not loose, as in ringworm. In tinea tonsurans there is a history of contagion, which is not the case in eczema. The course pursued by squamous eczema is usually chronic, and it does not increase and extend peripherically like tinea tonsurans. Itching is also much more marked in eczema than in ringworm. The eczematous patches are not usually sharply defined, but generally fade into the surrounding surface, whereas the lesions in ringworm are circumscribed and circular in shape. Eczema may in rare instances follow or coexist simultaneously with ringworm. When tinea tonsurans has existed for a long time, or has been modified by treatment, it is much more difficult to diagnosticate.

In seborrhœa of the head the scaliness is generally diffused, often involving the entire head; whereas in tinea tonsurans the patches are usually circular in shape and not distributed over the whole head. The hairs in seborrhœa are not diseased, while in ringworm they are brittle, twisted, or broken off. Seborrhœa can also be differentiated from tinea tonsurans by the absence of the parasite when examined with the microscope, and by being non-contagious. Itching is generally marked in seborrhœa, and in ringworm the itching is usually slight. Seborrhœa, moreover, occurs most frequently in adults, while ringworm of the scalp is very rarely, if ever, seen in individuals of riper years.

The lesions of psoriasis, when occurring on the scalp, may bear some resemblance to those of tinea tonsurans. The difference in the history and the course of the two affections, together with the number and characteristic appearance of the scales and the healthy condition of the hairs in psoriasis, should prevent an error in diagnosis. Furthermore, psoriasis is not contagious, and a parasite is not met with.

Alopecia areata is frequently mistaken for tinea tonsurans. In typical cases of the former affection, however, the patches are totally devoid of hair, and the affected surface presents a smooth, polished appearance, not unlike a billiard ball. In atypical cases, in which the diagnosis is in doubt, the microscope must be resorted to.

Tinea favosa capitis in its earliest stage, and before the characteristic crusts have formed, may likewise be confounded with the disease under consideration; the appearance, however, of the typical favus crusts will help to differentiate between the two affections. The microscopical characteristics of the parasite in the respective diseases are also quite different, the one affection, favus, being due to the achorion Schönleinii, and the other, ringworm, to the trichophyton fungus. Alopecia of a permanent character is also apt to exist in favus; while in ringworm, alopecia, when it is present, is usually slight. The hairs in favus may be removed more easily than when healthy, but the bulbs and capsules will be found to be complete; in ringworm they have a tendency to break when an attempt at epilation is made, or when extracted they are seen to be deprived of their bulbs.

Treatment.—Tinea tonsurans is always curable, but the time required to effect a cure varies considerably, and will be governed by the chronicity of the affection, the area involved, and the condition of the general health. Some cases may be cured in six weeks to three months, while other chronic cases are exceedingly rebellious to treatment, and may have to be treated for months, or even a year, before they can be pronounced cured.

When ringworm occurs among children in schools or homes it is much more difficult to subdue than when occurring sporadically. Like all vegetable parasitic affections of the skin, it has a pronounced tendency to relapse. The patient must remain under observation for some time, even after the disease is apparently quite well; and a case of ringworm of the head can not be considered cured, so long as a broken hair or stump can be found which shows the presence of conidia under the microscope.

The same remedies used in tinea circinata will be found to be applicable in the treatment of this disease, as both affections owe their origin to a common fungus, the trichophyton. Tinea circinata is more easily cured than any of the other forms of tinea. Tinea tonsurans, however, is quite obstinate to treatment, due to the difficulty experienced in getting the remedies employed to penetrate sufficiently deep and to reach the fungus, which frequently has its seat at the lowest part of the follicle. The treatment of ringworm of the scalp is the *bête noir* of the dermatologist. The remedies recommended are very numerous, and their name is legion.

As already stated, all cases of ringworm of the scalp are curable. It must be remembered, however, that the treatment must be pursued with the greatest perseverance. The primary step in the treatment consists in cutting the hair as short as possible in the vicinity of the lesion, or, when several patches are present, in removing the hair on the entire head, which may be done with the scissors or razor. The advantage in having it cut short lies in the fact that the lesions can be treated better, and any new lesions which may arise can be easier discovered; when the hair is allowed to remain long the primary source of infection is frequently overlooked, and the fungus has had time to penetrate into the follicles. Epilation of the diseased hairs and the employment of parasiticides will tend to destroy the parasite.

The disease being of an exceedingly contagious nature, proper care must be used to isolate the affected individual from others. The child should use separate towels, should sleep alone, and have a separate comb and brush, and should be prevented from using the wearing apparel of other children. The lining of caps and hats, after having been worn, should be frequently removed and burned, and it is well to replace the lining with thin paper, which may be readily renewed every day. The scalp should not be brushed, as brushing tends to disseminate the fungus over the entire scalp. To prevent the propagation of the spores, it is necessary to anoint the whole scalp with carbolized oil (1 to 20). It is also well to wash the hands of the other children in the same household every day with solutions containing borax.

Local treatment alone will generally be sufficient to effect a cure in anæmic children, and in chronic, rebellious cases the internal administration of a suitable tonic will be found to be advantageous. The patches should be washed thoroughly every other day with sapo viridis, which removes the scales and a number of the spores mechanically; the parasiticide should be employed directly afterward. Whatever application is used, whether in ointment or liquid form, must be rubbed into the scalp thoroughly, and not merely smeared on the surface.

In older children epilation may be practiced, and the affected hairs situated around the margin of the patches and those which are broken off over the diseased area must be extracted. For this purpose Duckworth's large epilation forceps will be found most suitable, and a small area may be cleared of hair each day. This should be preceded by the application of a ten-per-cent ointment of cocaine in lanoline, for the purpose of deadening the pain and facilitating the process. It will be necessary to repeat the epilation of the hairs which have escaped the first manipulation as soon as they show above the surface, as a great number of hairs will break off when an attempt is made to extract them, and the diseased roots remain behind. In removing the hairs traction should always be made in the direction in which the hair grows, and the parasiticide must be employed at once after each epilation. When the disease is still confined to the surface, mild remedies are indicated; when, however, it has penetrated to the roots of the hairs, stronger remedies must be resorted to.

In very young children the affection is quite amenable to treatment, and Crocker speaks well of the following: ℞ Sulphuris, ʒ j; acidi carbolici, ʒ ss.; lanolin cum oleo, ℥ j; or hydrargyri oxidum flavum, ʒ j to ℥ j. In these cases sulphurous acid, sulphuret of potassium, hyposulphite of sodium, in lotions of suitable strength adapted to the age of the patient, will be found valuable. Whatever of these remedies are used, they should be applied twice daily, and their employment will be followed by a cure in thirty to sixty days. In children of more mature years, in whom the affection has existed but a short time, the following paint, known as Coster's paste, is highly recommended: ℞ Iodini, ʒ ij; olei picis, ℥ j; M. et solve (both ingredients should be slowly and carefully mixed). This solution should be applied to the patches with a brush, and, according to Crocker, the dark crust which forms after three or four days should be pulled off with the forceps, and not be permitted to remain until it is cast off, as more fungi and affected hairs adhere to the crust than when it is allowed to drop off itself; the part should then be thoroughly rubbed with sapo viridis and flannel, and the application renewed. A few applications will generally effect a cure in recent cases; in chronic cases, or when the disease has existed for a number of months, the process must be renewed several times. In recent cases blistering may often be employed to advantage.

According to Dr. James Poulis, the following treatment is accompanied by excellent results: The child's eyes are protected by a towel tied around the head; the hair surrounding the affected area should be cut short, or, when numerous lesions exist, the entire hair must be removed; the patient's head is held over a basin containing warm water, spirit of turpentine is applied to the patches, and the turpentine is thoroughly rubbed into the scalp with the finger; after a few minutes the turpentine will have cleared the scales away and have penetrated to some depth; the parts are then thoroughly washed with ten-per-cent carbolic-acid soap, which relieves any smarting that may exist; after drying the head carefully, several applications of tincture of iodine are made to the lesions, and after the paint and hair have dried a solution of carbolized oil (1 to 20) is rubbed over the entire hairy scalp, for the purpose of destroying any spores that may be present.

Some authors regard washing of the scalp as contraindicated in this affection, as they consider that the moist heat favors the growth of the fungus, and suggest using spirit of wine in lieu of water. Bichloride of mercury in ointment form, gr. 2–5 to the ounce, or used as a lotion, gr. 2–5 to ℥ j of water or alcohol, will prove quite serviceable. When employed in young children it should not be used over an extensive surface for fear of producing salivation. In disseminated and superficial varieties of ringworm, carbolic acid ʒ j–ʒ iij, to glycerin ℥ j, singly or combined with other remedies, is well spoken of. Daily sponging of the head in recent cases of ringworm with diluted solutions of thymol, borax, or naphthol, to be followed by a thorough application of a fifty-per-cent boro-glyceride solution, is also lauded. An ointment of oleate of mercury, in the strength of five to twenty per cent, is also highly recommended.

Alder Smith praises the oleate of mercury, dissolved in a heavy petroleum oil (hydrarg. oleat. cum petroleo) instead of in oleic acid; it is prepared by dissolving ten parts of oleate of mercury in ninety parts of heavy petroleum oil. Its use is followed by only slight irritation of the scalp. This remedy may be employed in ten-per-cent solution in children under seven years of age; in younger children it can be diluted with ordinary petroleum or crystal lamp oil. This drug possesses great power of penetration. Mercuric oleate, one or five parts to ten of lanolin, is also a good remedy in all stages of the affection. In recent cases in which the disease has spread over a larger area the following ointment may be used: ℞ Acidi carbolici, ung. hydrarg. nitr., ung. sulphuris, āā ℥ss. M. ft. ung. Sig.: Apply twice daily to patches and once daily to entire scalp. This preparation may be employed in children over eleven years of age. In children under this age the quantity of carbolic acid should be decreased and the unguentum sulphuris increased.

In more obstinate cases an ointment of oleate of copper, ʒj to the ounce, will be found quite useful. In suitable cases the strength of this ointment may be increased to ʒiv to the ounce. Crocker states that he has used equal parts. This ointment should be rubbed in thoroughly twice daily; following its use the affected hairs frequently fall out and epilation is usually made easier. According to Morris a mixture of thymol or menthol, ʒss., chloroform, ʒij, olive oil, ʒvj, is very beneficial.

The use of chrysarobin in ointment form is also advocated; the disadvantages, however, following its employment, to which reference has already been made under Tinea Circinata, militate against its employment. In chronic cases salicylic acid may be applied in ointment form (ʒj–ʒij to ℥j), or in solution (gr. xx to lx to ether or chloroform ℥j). According to Crocker, salicylic acid plaster acts very beneficially sometimes, and renders epilation easier. That author employs the following method: The hairs over the affected area and to some distance beyond the lesion are shaved off. A mixture of salicylic acid, gr. x, with collodion, ℥j, is then applied every day for a week to and around the lesion. At the expiration of that time the thick crust is carefully removed with the forceps. After the crust has been entirely removed the shaving is repeated, and the mixture is used again in the same manner and for the same length of time. He considers that the protective crust formed by the collodion prevents contagion and does not permit the air to enter, and the fungus, being aërobic, as demonstrated by Vidal, is prevented from developing. When the crust is removed with the forceps great quantities of hairs come away with it. The process of removing the collodion is attended with some pain, and this method, therefore, can not be employed in children of tender years. In children over seven years of age its use is permissible. Should the removal of the collodion give rise to excoriation, an ointment containing boric acid must be used until it has disappeared, and then the collodion should be reapplied.

Another method employed in the treatment of ringworm is recommended by Dockrell, and consists in shaving and washing the head with hydronaphthol soap (five per cent), and after drying the parts hydronaphthol plaster (ten per cent) is cut into strips and applied ; this is covered with hydronaphthol jelly (ten per cent). After four days the plaster should be removed, the head carefully washed, and another plaster (twenty per cent) reapplied, which should remain *in situ* for one week. At the expiration of that time a new plaster (ten per cent) is used, and retained for ten days. Should the disease still be found to exist, this procedure is again resorted to. Eichhoff advocates hydroxylamin, particularly the chlorhydrate. Hydroxylamin is a substance which occurs as colorless crystals, and dissolves readily in water, alcohol, and glycerin. This drug possesses marked reducing qualities, and is therefore advantageously employed in diseases due to vegetable parasites. The affected parts having been previously washed, he has the following formula applied three to five times a day: ℞ Chlorhydrate of hydroxylamin, gr. $\frac{1}{10}$; alcohol or glycerin, gr. l. Sig.: apply externally. A solution of the strength of 1 to 1,000 will be found sufficiently strong in the beginning. In obstinate cases, and where the disease is confined to very small places, croton oil may be used. It must, however, be applied very cautiously and only to very small areas, as its use may be followed by permanent alopecia, and should never be used in young children. In very obstinate cases a gold pen is dipped in croton oil and introduced into the hair-follicles. Glacial acetic acid, or cantharidal collodion, may also be painted over the patches, once weekly, or even oftener in chronic cases. A milder application of one of the parasiticides may be employed as an adjunct to this treatment.

TINEA BARBÆ. (ARTHUR VAN HARLINGEN AND E. J. STOUT.)

Synonyms: Tinea Sycosis; Tinea Tricophytina Barbæ; Trichophytosis Barbæ; Sycosis Parasitica, or Parasitaria; Parasitic Sycosis; Ringworm of the Beard; Barber's Itch; Mentagra Parasitica; Herpes Tonsurans Barbæ; Fr., Sycosis Parasitaire; Germ., Parasitäre Bartfinne.

Definition.—Ringworm of the beard is an inflammation of the hair-follicles of the hairy parts of the face and neck occurring in the adult male.

Etiology.—The disease is contagious, and is due to the presence of the trichophyton fungus in the hair-follicles. This fungus is the same as that occurring in tinea tonsurans and tinea circinata, and is generally contracted in barber shops by means of a razor, shaving brush, or strop in which the fungus may exist. It is very unusually encountered in individuals who shave themselves, with the exception of cases in which some of the family are affected with ringworm, and from whom the disease has been contracted. The favorite locations of the disease are the chin or the neighborhood of the chin, the neck, and submaxillary region. The upper lip is but rarely attacked. One or both sides of the face may be involved.

Symptomatology.—The disease is characterized by the appearance of tubercles and pustules, and generally commences as tinea circinata in the form of patches, which are slightly red and scaly. These patches show a tendency to get well in the center and to extend peripherically. The redness and scaliness increase, and the affected parts are swollen and indurated. The hairs are soon affected, and present a dry, brittle appearance, break easily, tend to become loose, and can be removed with ease. They fall out spontaneously, and frequently present a white appearance, due to the presence of the fungus. The subcutaneous structures become affected, and distinct induration is present; nodules and papules appear on the skin, and pustules are observed to exist around the hair-follicles. The diseased area presents a dusky, reddish, or purplish appearance, and is covered with tubercles and pustules, varying in shape and size, which are situated to some depth in the corium, feel firm, and are somewhat painful to the touch.

Generally the disease is accompanied by very slight suppuration, or it may be entirely absent; but sometimes it is quite marked, and numerous crusts may appear, resembling pustular eczema in appearance. If these crusts are removed, a moist, irregular, reddened, and discharging surface is presented to the view, which bears a resemblance to the pulp of a fig, whence the name *sycosis*, from the Greek word *σῦκον, a fig.*

The disease gives rise to more or less itching, burning pain, and swelling. These symptoms are usually, however, less aggravated than in sycosis of non-parasitic origin. The affection generally pursues a chronic course, and if not treated may last for years. Relapses are of frequent occurrence unless thorough and persistent treatment is employed. The parasite, the trichophyton fungus, whose parasitic nature was demonstrated by Gruby in 1842, penetrates into the hair-follicles and reaches the hair-shafts and roots of the hair, causing separation of the parietes of the follicles from the hair shaft; its presence gives rise to inflammation and suppuration of the follicles, varying in intensity, and to an infiltrated condition of the neighboring tissues. The parasite can be readily discerned with the microscope, and presents the same appearance and arrangement as in tinea tonsurans (q. v.). Microscopically the diseased hairs appear swollen, sometimes twisted, and the roots show pathological changes. The disease does not occur frequently. In Scotland the affection is occasionally observed; in France it is of frequent occurrence; whereas in Austria it is very rare. In America, according to Duhring, the frequency of the disease seems to vary in the different cities, being most often met with in Boston.

Diagnosis.—Tinea barbæ is liable to be mistaken for *sycosis non-parasitica;* the former affection, however, differs from non-parasitic sycosis in spreading more rapidly, in being exceedingly contagious, and in appearing primarily as small, reddish spots, which show a tendency to get well in the center and to spread peripherically. Non-parasitic sycosis is of much more frequent occurrence, and is not contagious; the lesions which first appear consist of pustules, situated at the mouth of the follicles, and the pustules are pierced by a hair; the inflammation involves the superficial cutaneous surface, and free suppuration occurs; while in parasitic sycosis the deeper structures are involved, and less suppuration is present. In non-parasitic sycosis much pain, itching, and burning exist, which symptoms, as a rule, are only slight in the parasitic variety. It also differs from non-parasitic sycosis in usually leaving the upper lip intact. In parasitic sycosis the hairs may be removed with ease and without pain, and their root sheath is frequently lacking; while in sycosis non-parasitica the hairs are not affected, retain a healthy appearance, are firmly seated, and extracted with difficulty and pain to the patient. Partial permanent alopecia is of much more frequent occurrence in the parasitic than in the non-parasitic form.

Pustular eczema resembles parasitic sycosis, but differs from it in being more superficial, and accompanied by severe itching, burning, discharge, and crusting, while these symptoms are usually not severe in parasitic sycosis. In pustular eczema the hairs are normal, and nodules do not exist.

Syphilitic eruptions of the beard may simulate sycosis parasitica; they are, however, distinguished from the latter affection by the history, by the different appearance of the lesions, which are of a coppery color in syphilitic eruptions, while the lesions in sycosis parasitica are of a dark red; further, by the absence of the parasite, by the different appearance of the hairs, which are healthy in the former disease, and by the coexistence of other syphilitic symptoms in other locations.

In tinea sycosis ringworm is sometimes present on different parts of the body. The crusts occurring occasionally in parasitic sycosis may bear a resemblance to favus crusts; in favus, however, excoriation and a discharging surface are not present, and the characteristic nodules and tubercles seen in sycosis parasitica are wanting. In all cases in which the diagnosis is in doubt, microscopical examination should be resorted to.

Treatment.—The treatment consists of thorough epilation and the employment of parasiticides. Epilation must be practiced daily, which is not attended with difficulty, as the hairs are loose and can be easily extracted. The application of the parasiticide must be employed directly after epilation. Any crusts which may be present should be thoroughly soaked with olive oil, washed with soap and hot water, and removed. The use of poultices is contraindicated, as the moist heat furnishes a favorable medium in which the fungus flourishes.

Applications of thymol, dissolved in oil, in ten-per-cent strength, to the hairy parts of the face will be found serviceable in preventing the transmission of the disease to other parts. A lotion of bichloride of mercury, gr. ij to aqua ℥ j, to which glycerin is added, is highly spoken of. According to Duhring, the yellow sulphate of mercury (gr. xxx to ℥ j), in ointment form, and washes, consisting of sulphurous acid, or sulphite or hyposulphite of sodium, ʒ j to aqua ℥ j, will be found quite efficacious. Some authors recommend that the beard should be shaved daily. It is not necessary to puncture the pustules, as the removal of the hair will permit the contents to escape.

Chrysarobin (gr. xxx to ℥ j), in ointment form, is also employed advantageously; the disadvantages attending the employment of this drug must, however, not be forgotten. A solution of boro-glyceride in glycerin, in fifty-per-cent strength, is also highly recommended.

Ointments, consisting of oleate of copper, ʒ ss. to ℥ j, or of sulphur, ʒ j, carbolic acid, ʒ ss., lanoline cum olei, ℥ j, are also lauded. In fact, any of the parasiticides employed in the treatment of the vegetable parasitic diseases may be utilized in the treatment of tinea sycosis. The strength of the parasiticide used in tinea tonsurans should be modified in the treatment of this affection.

The time required to bring about a complete cure varies. Some cases may be speedily cured, whereas others are quite rebellious to treatment, and require much persistence and perseverance to prevent relapses.

TINEA IMBRICATA.

(Arthur Van Harlingen and E. J. Stout.)

Synonyms: Tokelau or Bowditch Island Ringworm; Le Peta; Gune (Fox); Cascadöe (Meederwoort); Herpes Desquamans (Turner); Chinese Ringworm; India Ringworm; Burmese Ringworm; Malabar Itch.

Definition.—Tinea imbricata is a vegetable, parasitic, contagious disease of the tropics, in which patches of rings within rings are formed.

Fox, an American, was the first to describe the disease, to which he gave the name *gune* (signifying *skin*). This affection has since been described by various authors, under different names, thus: by Turner, as herpes desquamans; by Meederwoort, as cascadöe; by Manson, as tinea imbricata. It occurs only in tropical countries, and is widely distributed over the islands of the Pacific Ocean and the Malay Archipelago and the group of Gilbert Islands. The disease is said to have been brought over from the Gilbert Islands to the Union or Tokelan group—hence called Tokelau ringworm—and from there to the Samoan Islands. Königer gives the following account of the affection:

Symptomatology.—The malady begins with an eruption of small papules, mostly grouped in circles, which cause intense itching and desquamation of the epidermis around their periphery. Afterward these circular affections coalesce, the skin becoming at the same time hard, dry, and brittle; and in the end, when the disease has become diffused over the whole body, the skin looks as if covered with a clayey substance. An examination shows that this substance consists of epidermic scales of various sizes up to half an inch, which are in part detached and in part still adhering to the skin. The hair of the body is almost gone at the places where the eruption occurs, but not the hair of the head, where the eruption is very scanty, as it is also on the face. The only inconvenience to the patient is the itching, which is often unbearable. Microscopic examination shows that the seat of the malady is limited to the epidermic layers. Among the epidermic cells there are more or less dense strata of mycelial threads, with transparent, colorless contents, as well as spherical cells, filled with homogeneous substance, occurring either in groups or singly. Königer has found the mycelium only in recent cases. Intense itching and heat accompany this affection, and circular stains or irregular lines exist after desquamation has occurred, which are apt to remain. The affection occurs in either sex, regardless of age, is eminently contagious, and may occur on any part of the body, very rarely attacking the head, face, and forehead. When it has become chronic it may involve a large area of the body. The native population hold the disease in great dread, and often resort to heroic measures, such as the removal of the diseased part with the knife. Much disfiguration accompanies the disease, although the patient's general health remains unimpaired.

The disease is quite distinct from tinea circinata, and the fungus does not penetrate into the follicles, and leaves the hair unaffected. The disease spreads over the skin at about the rate of a quarter of an inch weekly. Manson gave the name of tinea imbricata to this disease, and describes cases occurring in China and some other parts of eastern Asia. According to that author, the affection occurs chiefly in the straits of Malacca and in the islands of the Malayan Archipelago, and he is of the opinion that certain peculiarities of climate are required for the development of the disease. He has demonstrated by experiments that inoculations with the fungus of tinea imbricata always gave rise to that affection. He says: "After inoculation there is an incubation period of about nine days. At the end of this time the fungus has multiplied sufficiently to slightly elevate the epidermis under which it is growing, and forms a brown mass between it and the corium. When this has obtained a diameter of about three eighths of an inch the epidermis in the center gives way; but as it is still organically continuous with the sound skin at its margin, it is not completely shed, but remains as a fringe round the central hole. By friction or other means the free edge of the scale is from time to time removed, and the brown, central fungus and the tissue it is mixed with, now no longer protected by a closely adhering epidermis, are rubbed off as far as the attachment of the scale, and the exposed corium appears pale. Just beyond this point the advancing fungus shows through the epidermis as a brown rim, perhaps very slightly elevated, about one sixteenth of an inch in breadth. When the entire ring thus formed has attained a diameter of about half an inch, a brown patch is again seen to be forming at its center; this in its turn also cracks the young epidermis over it, and a second ring is formed inside the first, which it follows in its extension. A third brown central patch is formed in the center of the second circle, and behaves in exactly the same manner; and so on, with a fourth, fifth, and a never-ending series of concentric rings."

The identical disease has been encountered by Macgregor in the Fiji Islands. Though only existing in individuals who had arrived from the Solomon Islands, the New Hebrides and Lime Islands, he has never met with a case among the native Fijian element or among Europeans. He regards the disease as being due to a fungus. The disease described by Meerderwoort as *cascadöe* is considered to be identical with tinea imbricata, and is said by that author to make its appearance endemically in the tropics during the second and fourth year of childhood. The fungus has its seat in the layers of the epidermis, does not penetrate below the epidermic mucous layer, and leaves the hairs unaffected; the fungous elements are much more numerous than in tinea circinata; the chains of spores far exceed the mycelial threads in number. The spores in tinea imbricata, as compared with those of tinea circinata, are of nearly the same size, but differ in shape, being oval, rectangular, or irregular, seldom globular; whereas in tinea circinata they have a globular form. The mycelial threads in tinea imbricata are distinguished from those occurring in tinea circinata by being long, straight, or somewhat curved.

Diagnosis.—The diagnosis of this disease in countries where it occurs in endemic form is devoid of difficulty. It differs from tinea tricophytina in not attacking the hairy portion of the head, and in frequently involving the entire body surface. In the latter affection the patches exhibit a tendency to heal in the center, while spreading peripherically;

whereas in tinea imbricata the patches are concentric, and tend to spread over the center, while the external rings spread at the periphery.

Treatment.—The treatment consists in careful disinfection or destruction of the wearing apparel and in removal of the scales by means of appropriate baths; after this has been accomplished the affected parts should be, according to Manson, painted with iodine liniment and a more extensive application made daily. As in all fungous diseases, relapses are apt to occur. The same treatment employed in tinea circinata is indicated in this affection. Crocker suggests the employment of Goa powder or chrysarobin, used as in ringworm of the body.

FUNGOUS FOOT OF INDIA. (ARTHUR VAN HARLINGEN AND E. J. STOUT.)

Synonyms: Podelcoma; Mycetoma; Ulcus Grave; Tubercular Disease of the Foot.

Definition.—Madura foot, etc., is an affection endemic in character, almost exclusively confined to the foot or leg, involving the deeper structures. Occasionally the hand is attacked, and very exceptionally the shoulders and scrotum.

It occurs endemically in various parts of India, particularly in Madura, but has also been observed to exist in Mexico and the United States. Europeans appear to be exempt from the disease. Men are more prone to contract the affection than women, and the disease makes its appearance regardless of age, although occurring very infrequently below puberty.

Symptomatology.—The disease is divided into two varieties, the pale or *yellow* and the *black*, the latter being of most frequent occurrence. Huntly, of India, described the disease as commencing with a little pimple on the plantar surface of the foot, which later became a pustule and burst, discharging puriform matter and small, round, black bodies resembling seed. The neighboring skin enlarged, and another pustule made its appearance alongside the first, bursting and discharging as before. On inspection, there was seen lying across the sole of the foot, behind the ball of the big toe, a sore which, from the presence of two or three openings on the surface, somewhat resembled a carbuncle. There was one pustule seemingly at the point of bursting, and on incising this puriform matter came away, followed, on pressing it, by several round, black bodies about the size of No. 2 shot. They were perfectly round, and, on taking them between the forefinger and thumb, were found to be rough and somewhat brittle. The skin invaded by the disease was indurated, and raised a little above the surrounding surface, and this, as it proved, was a sufficient guide in the operation as to the extent of the disease and to the amount to be cut out superficially. The length of the sore was about two inches. The tumor was removed by operation, and section showed that the black bodies were lodged in perfectly round canals, communicating with one another and preserving the same caliber throughout; and the walls were composed of dense fibro-cartilagelike material. The disease begins insidiously with a swelling, which gradually increases in size, resembling a tumor, and is almost devoid of pain, except when subjected to firm pressure; gradually a small vesicle or abscess forms, which bursts and discharges sero-purulent matter, in which whitish-yellow or black bodies resembling fish-roe are contained; cutaneous sinuses forming in various directions lead to the deeper structures and perforate all the tissues and bones. The affection usually attacks one foot, which is much swollen and misshapen; it may, however, involve only parts of a hand or foot. The palmar aspect of the finger or thumb and the plantar aspect of the toe or the spaces between the toes are the regions frequently affected primarily. The progress of the disease is decidedly slow, requiring several years before the entire foot becomes totally disorganized, though sometimes a large part of the foot may become involved within twelve months. Crocker states the average period to be between three and seven years. In some cases the diseased member increases exceedingly in bulk and weight. It would seem that the affection spreads by the sinuses extending through the tissues.

Etiology.—The disease has been ascribed to the presence of a splinter or thorn in the foot or following slight traumatism; in a number of cases dracunculosis has preceded an attack of mycetoma, but no etiological connection has been demonstrated to exist between these affections. Attention has been called to the possibility of the fungus gaining entrance through the skin in persons who go barefoot in low, wet ground, as is the case in Guinea-worm disease. Very frequently the origin of the disease is veiled in obscurity.

Pathology.—On making a section of a diseased foot, according to Carter, the following conditions are present: General confusion of parts, owing to absorption of the bones and fibrous thickening of the soft parts; often the presence of granules separated or aggregated in mulberrylike masses of a yellow or brown color, lodged in spherical cavities excavated in the bone or in the soft parts, or in tunnels or channels leading from the cavities to the apertures on the surface, also lined by membrane; these granules are present in the discharge. Sometimes there is a deposit of fleshy substance, containing numerous minute particles (white or red), and occupying the same localities as the above-mentioned granular deposit. Lastly, in the same localities, we find black granules, spheroidal, tuberculated masses of the same color, radiated in structure, which have been mistaken for melanosis or blood-clots. A fungus, called the *chionyphe Carteri*, has been found in the black variety, and regarded by that observer as the morbific element of the affection. Dr. Carter, and also Crookshank, are of the opinion, based on examinations with the microscope, that the conditions, clinical as well as pathological, found in Madura foot, correspond to those existing in *actinomycosis*, and regard the disease as actinomycosis occurring in human beings. No case of spontaneous recovery has been recorded; the affection pursues a slow progressive course, resulting in total disorganization of the tissues, with loss of the bones of the foot, the arch of which disappears, the muscles atrophy, the tendons degenerate, and the patient succumbs to exhaustion or some intervening complication.

The **diagnosis** is not attended with much difficulty after the sinuses have appeared and the discharge takes place; it may, however, in the earlier stage of development, be mistaken for dracunculosis.

The **treatment** consists in thorough removal of the diseased portions in the earlier stage of the disease, or in amputation of a finger or toe. In the later stage the only means of effecting a cure consists in amputating the limb, and great care should be exercised in making a careful exploration, to be sure that no diseased area remains above the point of amputation.

ACTINOMYCOSIS OF THE SKIN. (S. POLLITZER.)

Definition.—A chronic affection of the subcutaneous tissues or other parts, characterized by the occurrence of nodular tumors with fistulous openings, due to infection with the actinomycis or ray fungus.

Symptomatology.—The disease may affect the foot, the hand, the scrotum, the shoulder, the face and neck, or internal organs. In the vast majority of cases in Europe and America the parts adjacent to the mouth are the seat of the affection. We have no knowledge of the earliest form of the disease; the diagnosis has been made only in advanced cases. The appearances are then very much like those of sarcoma. A nodular tumor, livid or bluish-red on its surface, develops under the skin. It is at first firm and resistant. After a time fluctuation may be detected in one or more nodules, and presently the skin breaks down over the nodule, or there is burrowing of pus and a fistulous tract is established, with an opening at some distance from the tumor. The discharge from the opening is at first abundant, thick, purulent; later, thin and sanious. Mixed with it are numerous small, sulphur-yellow, friable bodies, from a millet seed to a small barleycorn in size—conglomerates of the mycelium of the specific fungus. The disease is of great chronicity, and may remain for years localized at the point first affected, spreading very slowly but steadily, and invading new tissue by continuity, as from the neck downward into the mediastinum. The lymphatic glands are never involved except when there is secondary cocci infection. Before suppuration takes place there are only slight or no subjective symptoms. After suppuration a chronic abscess is established, which may lead to the usual secondary constitutional disturbances, and result in death from exhaustion or from sepsis or pyæmia. Sometimes, but rarely, the organism breaks through into a blood-vessel, and thus, spread throughout the system, miliary actinomycotic tumors develop, more especially in the lungs. In actinomycosis of internal organs there may be no cutaneous lesion, or a fistulous tract may open on the integument.

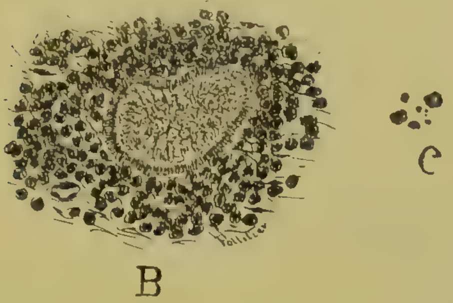

Fig. 98.—B, section from an actinomycotic tumor of the neck, showing granulation tissue and mass of fungus; C, to show the yellow granules in natural size.

The disease already described as mycetoma, or the Madura foot, is a form of actinomycosis endemic in India, of which a single case (Kemper, Amer. Pract., September, 1886, quoted by Duhring, p. 490) has been described in this country, and one in Italy (Monatsh. f. prakt. Dermatol., x, 1890, p. 361).

Anatomy and Pathology.—The clinical appearances, we have said, resemble those of sarcoma; in the histological structure of the tumors there is even a greater resemblance, so that the diagnosis of sarcoma or of osteosarcoma, seemingly confirmed by the microscopic examination, is still commonly made in cases of actinomycosis. The tumors belong to the class of infective granulomata, and are characterized by a high degree of development. They are made up chiefly of round cells, with numerous fusiform connective-tissue cells, and are highly vascularized. The breaking down of the growth and the establishment of fistulæ present no histological features of special interest. The characteristic granuli found in the discharge are present in the growth, and the mycelium of the pathogenic fungus may be found throughout the tissues of the tumor.

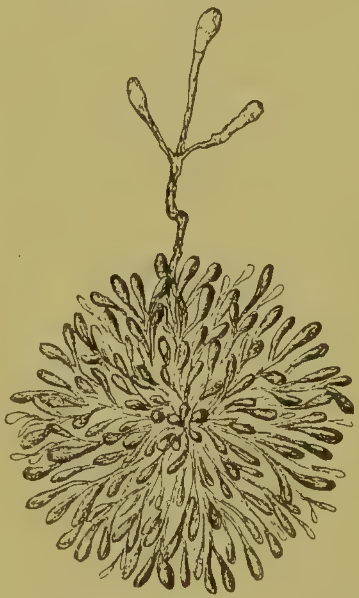

Fig. 99.—Actinomycosis from a culture, showing the ray arrangement and the club-shaped ends of the mycelium threads. Magnified about 800 diameters (after Ponfick).

Etiology.—The recognition of the disease is of recent date. In 1867 Bollinger discovered the peculiar fungus in a case of lumpy jaw, as the disease is called in cattle when it affects the maxillæ. We are indebted chiefly to Ponfick, Israel, and Johne for our knowledge of the disease in man, and for the complete demonstration of the causative relation of the fungus to the disease. The actinomycis or ray fungus consists of mycelia which divide dicotomously, the threads radiating from a center. Each thread is club-shaped at its distal end, and this enlargement probably contains the organs of fructification. The granuli previously referred to as present in the tumor and in the discharges are simply masses of fungus. It appears certain that the germ can attain a foothold in the system only through some break in the continuity of the surface (cf. a case in which inoculation occurred by means of a splinter of wood driven into the foot, Monatsh. f. prakt. Dermat., x, 516). Healthy animals to whom cultures of the fungus have been fed have not acquired the disease, which, however, follows inoculation under the skin or into the peritoneal cavity. Carious teeth and lesions of the mouth are probably the most common points of entry for the germ. We find the disease most common in those who have to do with cattle or feed. The diagnostic significance of this fact should be borne in mind.

Diagnosis.—The diagnosis in the unbroken tumor is quite impossible. Scrofuloderma, carcinoma, and sarcoma may be considered. The first is a disease of adolescence and the glands are always involved. In cancer there is usually considerable pain, and in it also the glands are sooner or later involved. The tendency to breaking down is generally more marked in actinomycosis than in sarcoma. An explorative incision and microscopic examination of a piece of the tumor would clear the diagnosis. Carelessness alone could account for failure to recognize the disease after pus containing the characteristic granuli is discharged. The disease is not very common, but as the knowledge of it has become more general the number of cases reported has greatly increased, and it would appear not unlikely that the disease is much less rare than is generally supposed.

Prognosis.—The actinomycosis tumor must be regarded as a malignant growth. Left to itself it will continue to spread and to destroy tissue indefinitely. The prognosis, therefore, depends entirely on the localization of the tumor. Its treatment, of course, is purely surgical; and if the growth be situated externally, where radical treatment is possible, the prognosis is good, while it is bad in proportion as the location of the tumor makes it inoperable or not.

Treatment.—Extirpation of the growth with the knife is the only rational treatment. Where this is impossible, curetting may perhaps be employed and the cavity washed with strong antiseptics. In inoperable internal actinomycosis supporting measures are indicated.

TINEA VERSICOLOR. (ARTHUR VAN HARLINGEN AND E. J. STOUT.)

Synonyms: Pityriasis Versicolor (from πίτυρον, *bran*); Chromophytosis; Dermatomycosis Furfuracea; Mycosis Microsporina; Kleienflechte (Ger.).

Definition.—A vegetable parasitic affection of the skin, due to a specific parasitic fungus, the microsporon furfur, which appears in the shape of variously sized, irregularly shaped, dry, slightly furfuraceous patches, yellowish in color, found chiefly upon the trunk. The parasite to which the disease is due was discovered by Eichstedt in 1846, and was called microsporon furfur by Robin.

Symptomatology.—The affection occurs in the form of pin-head and split-pea-sized yellowish maculæ scattered over the affected part; these increase gradually in size, multiply and coalesce, and form patches with irregular outline, varying in size or covering a large area and well defined. More or less scaliness is noticeable in the patches. Usually the affection does not give rise to much itching in cool weather; but when the individual affected becomes warm and perspires freely, considerable itching is experienced. In some patients itching never occurs.

The favorite seat of this disease is the chest, abdomen, and between the scapulæ; it may, however, extend to neighboring parts, as the buttocks, groin, flanks, and also to the extremities, but rarely spreads below the waist or above the neck. It is stated that the face is never attacked. There is a case of Biart's, however, on record in which patches existed on the left cheek up to the external canthus, and on the forehead, involving the scalp somewhat; a lesion existed also behind the ear. Practically it is a disease confined to the trunk, and is only contagious to a very mild degree, although experimentally the fungus has been shown to be capable of producing the affection when inoculated. Köbner has been the only one to successfully inoculate men and rabbits with the disease. Von Ziemssen is of the opinion that the comparatively rare occurrence of this disorder on the neck, face, and hands is probably due to the fact that these parts are deprived of their superficial layers of epidermis, in which the fungus has its seat, most frequently and quickly by the use of soap and water. The disease has never been observed on the inner surface of the hands or the plantar surface of the feet. According to Von Ziemssen, tinea versicolor also frequently exists in men in the genital region, on the skin of the thigh, where the scrotum comes in contact with it. In this situation the spots are often of a more brownish-red to a coppery-red color. In women the disease very frequently occurs in small plaques in the pubic region and on the skin of the labia majora (Von Ziemssen). It requires a favorable medium for its development. According to Thin, moist parts of the skin of certain individuals during the period of sexual activity furnish the soil required for the development of the fungus. Males and females may be affected by the disease, the former, however, being more prone to contract it than the latter. It does not occur in very young or very old subjects. It is more apt to exist in phthisical patients, probably due to the fact that patients affected with phthisis are in the habit of wearing flannel without changing it, and to the profuse sweats in that disease, although it occurs frequently in persons possessing perfect health. Its spread is generally slow, and, if left to itself, it may last for an indefinite period. The affection has its seat in the superficial layers of the epidermis and exists in every climate, but hot climates are more favorable to its development. The peculiar color of the spots is probably due to the numerous strongly refracting masses of conidia. The discoloration affects only the most superficial corneous layers of the skin, and when it is removed mechanically the skin presents a slightly red appearance (Von Ziemssen). It is probably well to add that the affection known as *chloasma uterinum*, and which was formerly thought to be due to the presence of the microsporon, has nothing in common with tinea versicolor. The discoloration may vary in color, presenting a dark-brown appearance, as in a case of Crocker's. The variety known as *pityriasis nigra* has been observed in persons who had sojourned in warm latitudes. Hebra is of the opinion that pityriasis nigra is due to chronic phtheiriasis, which gives rise to pigmentation. Occasionally inflammatory and eczematous symptoms occur in individuals who perspire very freely, in which cases the lesions appear red, and frequently give rise to severe itching (Crocker). The presence of the fungus is readily demonstrated by treating some of the scraped-off furfuraceous scales with ether and adding a very small quantity of dilute liquor potassæ to the specimen and examining with the microscope. The microscopical appearances of the fungus are quite characteristic: the spores are rounded in form, and occur in groups in the laminæ of the corneous epithelium, and there exist masses of conidia exceeding those of ringworm in size, which are grouped like bunches of grapes, and with very abundant interlacing mycelia extending to the adjacent masses of conidia. The conidia are strongly refracting; the mycelia are rather short, and do not usually branch out. According to Neumann, the fungus develops very slowly, but may be easily cultivated, and can be grown in neutral glycerin. The spores divide by segmentation, and filaments of mycelium originate from them.

Diagnosis.—The diagnosis of tinea versicolor is not generally attended with much difficulty. The desquamation and the location of the affection, usually confined to the trunk, and the microscopical appearances, make the diagnosis comparatively easy. The diseases for which pityriasis versicolor are most likely to be mistaken are vitiligo, chloasma, and the macular syphiloderm. The lesions in vitiligo are round in shape and white, and the neighboring skin is dark; the small yellow macules existing at the margins of the brownish patches in tinea versicolor are absent in vitiligo, and there is a total absence of scales on scraping, and of inflammatory symptoms. From chloasma it is distinguished by the seat of the affection, the face and forehead being usually involved in chloasma, while in tinea versicolor the face is but exceedingly rarely affected, and in chloasma being simply a pigmentary affection, and presenting no scaliness or the presence of fungi.

Tinea versicolor may be confounded with the macular syphiloderm because of the similarity in the brownish color of the eruption; the latter, however, does not often occur in large patches, but in solitary round patches, which are characterized by absence of scaliness and itching, and may exist upon the face as well as on the trunk, and usually there are other symptoms of syphilis present.

The **prognosis** is quite favorable.

Treatment.—The treatment is simple, and to remove the disease thoroughly should be carried out perseveringly, as the affection is apt to relapse should only the minutest area affected by the fungus be overlooked. Sapo viridis should be rubbed in the affected area thoroughly every day for a week, and then after two days followed with a hot bath. This process will be found to be quite efficacious. Should any diseased area remain, this mode of treatment must again be resorted to. A solution of hyposulphite of soda, ʒ j to the ounce of water, applied twice daily, acts very beneficially, and should be persevered in for some time after the eruption has vanished. Pure or dilute sulphurous acid is also well spoken of. The underclothing should be subjected to a high degree of heat, immersed in boiling water, or, what is better, destroyed.

The mercurial parasiticides also answer very well; the liability of these remedies, when applied to a large area, of producing salivation, should, however, be borne in mind. Mechanical friction alone will remove the fungus in mild cases, but it is always advisable to employ a parasiticide, so as to insure a thorough cure. Tincture of iodine, applied to the affected area, in cases in which the disease is not extensive, is reputed to effect a rapid and sure cure.

ERYTHRASMA. (Arthur Van Harlingen and E. J. Stout.)

From ἐρυθρός, red.

Definition.—Erythrasma is a contagious cutaneous disorder of a parasitic nature, characterized by the appearance of reddish-brown patches of desquamation, and commonly appearing where the opposing surfaces of the skin come in contact, and due to the presence of the microsporon minutissimum.

Symptomatology.—This affection is usually met with in the axillary folds, in the groins, and where the scrotum touches the thighs, and between the nates. At first the affection resembles intertrigo or eczema in a mild form. The eruption commences in the form of small macules, varying in size from a lentil to that of a dollar, are of roundish or irregular contour, erythematous or slightly scaly in character, and sharply defined. They are usually few in number and not extensive, but may sometimes involve quite a large surface. The color varies from yellowish brown on the general surface to pale red in the cutaneous folds.

The patches are slightly scaly, and somewhat greasy to the touch; the furfuraceous scales are more noticeable at the periphery of the lesion, which is well defined. The patches are not easily detached from the epidermis, and if left untreated evince little disposition to improve. The disease is oftener met with in men than in women, and gives rise to only moderate itching; children are exempt from it.

Etiology.—Burchardt first described the disease, which is due to the presence of a very minute parasite, to which the name of *microsporon minutissimum* has been given by Von Bärensprung. The question is still *sub judice* whether the parasite should be classed among the fungi or bacteria. A very high power of the microscope is required to detect the presence of the parasite. According to Von Ziemssen, the scales are seen to contain, under the microscope, small threads, which are rather short, narrow, very pale, and slightly bent; quite long filaments are also visible, which sometimes consist of two or three segments. In some rare cases single longer threads consist of small flat segments, which join each other, resembling a string of pearls. Their greatest transverse diameter measures about 0·6 of a micro-millimetre; generally they are narrower; they vary exceedingly in length. The threads are smallest when inextricably interwoven and occurring in large masses, and their length frequently exceeds their breadth only about four or five times. Lateral branching or ramifications of the filaments are not visible, neither do forms of conidia appear. According to Payne, different vegetable forms are noticeable. That author has observed cells of a species of torula resembling in shape but exceeding in size the one existing in pityriasis capitis; he is not certain whether true spores exist, and is of the opinion that the fungus bears the strongest resemblance to involution forms of bacilli.

Diagnosis.—Erythrasma is generally limited to moist surfaces favorable to the development of the microsporon, but may extend to the neighboring body surfaces. The eruption spreads quite slowly and pursues a serpiginous course. The diseases with which this affection might be confounded are eczema marginatum, tinea versicolor, chloasma, and pityriasis rosea. The clearly defined inflammatory symptoms present in eczema marginatum and the microscopical appearances should prevent confounding erythrasma with this affection.

From tinea versicolor it may be distinguished by its location—the former usually being confined to the trunk—and by the darker color of the patches in erythrasma. The microscopical examination, however, would clear up all doubt, as the microscopical appearances differ in these two affections. From chloasma it is readily differentiated by the absence of the parasite, chloasma being a pigmentary affection devoid of parasitic organisms. The lesions in pityriasis rosea are of a rosy or pale red color, with a tawny tint, and show a tendency to heal in the center and, are not contagious.

The **treatment** is the same as in tinea versicolor, and the same rules should be observed. so as to guard against the affection recurring.

MAL DEL PINTO. (Arthur Van Harlingen and E. J. Stout.)

Synonyms: Spotted Sickness; Pinto Disease.

Definition.—Mal del pinto is a disease of the tropics, fungoid in character, in which the skin presents discolorations of various shades, and is accompanied by itching and desquamation.

It exists particularly in Mexico, where it occurs in an endemic form, pursuing a decided chronic course. It is, however, not confined to Mexico alone, but is met with in Central America, New Granada, Peru, and Chili, and in Venezuela and Brazil, particularly in the province of São Paulo, and is known in the different localities by various names. Thus, in Tabasco and Chiapas it is called *tiña* and *mal de las mauchas;* in Venezuela and Granada, *caraate*, or *cute* (which signifies "Look at his face"); in Panama it is known as *quirica*. Historians relate that it was transplanted from South America to Mexico in the eighteenth century. The first record of this peculiar affection dates back to the year 1760, and it is said to have existed in Mexico in the time of Cortes. The disease makes its home in the tropics, and does not extend either north or south beyond latitudes 27° and 28°.

Symptomatology.—Mal del pinto appears in the form of spots, which are scaly, and present quite different shades of color, and vary in shape, extent, and size. Frequently the eruption is mostly black in color, the affected individual resembling a negro. Often, in the later periods of the disease, an eruption tubercular in character exists. In the blue form of the affection the spots resemble grains of powder under the skin; they are first observed to be present on the face and extremities, but may involve nearly the entire surface of the body; the soles of the feet and palms of the hands, however, remain intact, and the lesions are rarely seen to exist uniformly on both sides of the body. The patches may be continually active; they grow and extend at their periphery, and may remain discrete, or, as the disease progresses, become confluent with the surrounding skin, and are but slightly elevated. In shape they may be either round or irregular, clearly defined or fade into the neighboring skin, and assume various colors, as black, blue, red, and white. The black and blue patches are situated superficially in the upper, whereas the latter are situated beneath the deeper epidermic layers. These spots are divided according to their location, respectively, into the *epidermic* and *subepidermic varieties.*

The first variety never penetrates as far as the rete mucosum, and when subjected to treatment and cured leaves no change behind on the surface of the skin; the spots occurring in the red and especially in the white variety differ in this respect.

The subepidermic variety affects the entire corium and rete mucosum. When the spots have once appeared they retain their original color through the entire disease. In some cases the lesions involve only a small space; then, again, they may be quite numerous. The spots grow larger during the progress of the affection, and may coalesce; thus they gradually spread over a large area, or over the whole body surface. When the disease invades hairy parts of the body the vitality of the hairs becomes impaired; they lose their color and fall out. The spots are primarily furfuraceous; but as the disease progresses, the patches become rough and dry, sometimes humid, greasy to the feel, and exude a sticky substance. Occasionally the disease commences on a perfectly healthy part of the skin; it is, however, more apt to supervene after a dermatitis. This applies especially to the white variety. Inflammation of any kind is not present, and when the spots are subjected to pressure no pain is experienced, nor do they change their color. The disease is accompanied by itching, which may become quite severe, sometimes preventing sleep at night; a very unpleasant odor is noticeable, which resembles the smell of foul, moldy linen, or that of cat's urine. The affection is always chronic, and recovery does not occur if left to itself; frequently its spread is quite slow, or it remains *in situ* for a long period. Constitutional disturbance does not occur in this disease. Ulceration is also occasionally observed to take place in the form known as the red variety.

Etiology.—The disease, as observed above, is regarded to be due to the presence of a fungus, having its seat in the epidermis, and of a contagious character. Under the microscope the fungi appear as spores, either spherical or oval in shape, measuring eight micro-millimetres in diameter, and filaments of mycelium exist, with which the conidia are connected.

The question is still undecided whether the different colors of the lesions occurring in this disease are due to different species of fungi, or whether they depend on the superficial or deeper situation of the parasite in the epidermic layers.

According to Lier, the blue variety of mal del pinto is non-parasitic, and this author was unsuccessful in attempting to inoculate his own arm, and also in trials on others. He admits, however, the presence of specific microbes in the white and particularly in the red variety, which he considers to be parasitic in character. Unfavorable hygienic surroundings and a hot, moist climate are favorable to the spread of the disease; temperature under 15° and elevations of five thousand feet put a stop to the affection. Indians, negroes, and mestizos are prone to contract it, whereas Caucasians seldom suffer from it. The spread of the disease is slower in the varieties known as the red and white; in the black and blue varieties the spots generally tend to spread more rapidly and more widely. Under proper treatment and favorable hygienic conditions the disease will cease; it is, however, prone to relapse. When the above-named conditions are neglected, the patient may be affected throughout his entire lifetime. The disease is not unfavorable to life; the discoloration produced by the lesions, however, is apt to remain permanently.

Mal del pinto is quite contagious, having known to have been communicated in numerous cases. It is probable that a number of other discolorations of the skin occurring in certain tropical countries are closely allied to mal del pinto. The reports given of these affections, however, are not sufficiently thorough or detailed to be relied upon. Thus, the disease known in Surinam as *lota* bears quite a resemblance to the disorder under consideration.

Diagnosis.—The diagnosis is devoid of difficulty in localities where mal del pinto flourishes. The mottled appearance presented by the lesions, together with the peculiar odor and furfuraceous scaling, are highly characteristic of the disease, and do not exist in any other cutaneous affection. During the earlier stages of development the discoloration is not present, and the eruption, owing to the dark color of the lesions, might be confounded with Addison's disease. The lesions, however, in mal del pinto are darker in color and better defined, and the affection is unaccompanied by constitutional disturbance.

From pityriasis nigra it can be distinguished by the tint of the patches, which are of a more uniform dark color, and by the presence of tubercles, which occur later during the disease.

Treatment.—The treatment is that of tinea versicolor, to which it appears to be allied, and the patient should be carefully watched for some time, as relapses are apt to occur. The white variety is thought to be unaffected by treatment.

B. ANIMAL PARASITIC DISEASES.

SCABIES. (FREDERICK J. LEVISEUR.)

Synonyms: Itch; Fr., Gale; Ger., Krätze.

Definition.—Scabies is a disease depending essentially on the burrowing of the itch-mite *acarus*, or *sarcoptes scabiei.*

This minute creature is not an insect, but belongs to the class arachnidæ, division *Acarinæ*, family *Sarcoptidæ.* The disease is characterized by the burrows or cuniculi, which are small canals, serving as a habitat for the impregnated acarus during her life. The presence of the parasite in the human skin—that is, its manifestation of life, its eggs, larvæ, fæces, and probably secretion of a very irritating quality (saliva)—give rise, first, to the production of papules, pustules, vesicles, bullæ, wheals, infiltrations, etc.; and, secondly, to itching, which, through consecutive scratching, produces excoriations, crusts, pustules, wheals, furunculi, etc.

Symptomatology.—Before describing the symptoms of scabies one by one, the fact must be stated that several symptoms, if not all, usually coexist, thus suggesting the nature of the disease at once to the practiced eye.

The burrows (Lat., *cuniculi;* Ger., *Milbengaenge;* Fr., *sillons*) are diminutive tunnels, dug by the impregnated female. When placed on the skin the mite inclines her head, raises her body by aid of the bristles of her hind legs, and disappears below the surface within half an hour. The burrows, which, according to Toereck, run along the lowest part of the epidermis, have the appearance of delicate, grayish, dotted lines, darker or almost black in persons who do not wash much. Though measuring, as a rule, from two to three lines, they may attain the exorbitant length of two inches. They have usually an irregular or tortuous course, representing segments of a circle, or assuming the shape of a horseshoe, or the letters C or S. Occasionally they form an angle with straight or curved sides. The point where the mite has entered the epidermis is more prominent as the other end, where the mite may be found, and is sometimes seen, as a small white speck shining through the epidermis.

The burrows contain the adult female, eggs, larvæ, and nymphæ, egg-shells, and dark spots, probably fæces. Openings have been described in the roof of the burrows. These are thought to be the places where young mites have escaped. The adult mite can only advance in the burrow, where it finally dies. The burrow, with its contents, is easily obtained for microscopical examination by clipping off with curved scissors the little piece of the skin containing the burrow (Fig. 100).

The itch-mite attacks with predilection certain regions of the body. The burrows may usually be found on the sides of the fingers, the interdigital folds, the wrists, the elbow joints, the axillæ, the mammillæ, the navel, the glans penis, the knee joints, and the buttocks. In children, the toes and the whole of the palms and soles may be invaded. With the exception of a few cases occurring in infants, the burrows are never found in the face. The parasite prefers these regions, I believe, not on account of the softness of the epidermis, as is claimed in many text-books, but because the skin of these regions is comparatively immovable or more firmly attached to the underlying tissues. Both these conditions are very favorable for the welfare of the mite.

The presence of the parasite in the human skin gives rise directly to an inflammatory process of the papillary layer of this organ. Papules, pustules, vesicles, or bullæ are formed, and may be found on or very near a burrow. Red, rather hard infiltrations, following the course of a burrow, appear not infrequently around the axillæ, the penis, the mammillæ, and the navel.

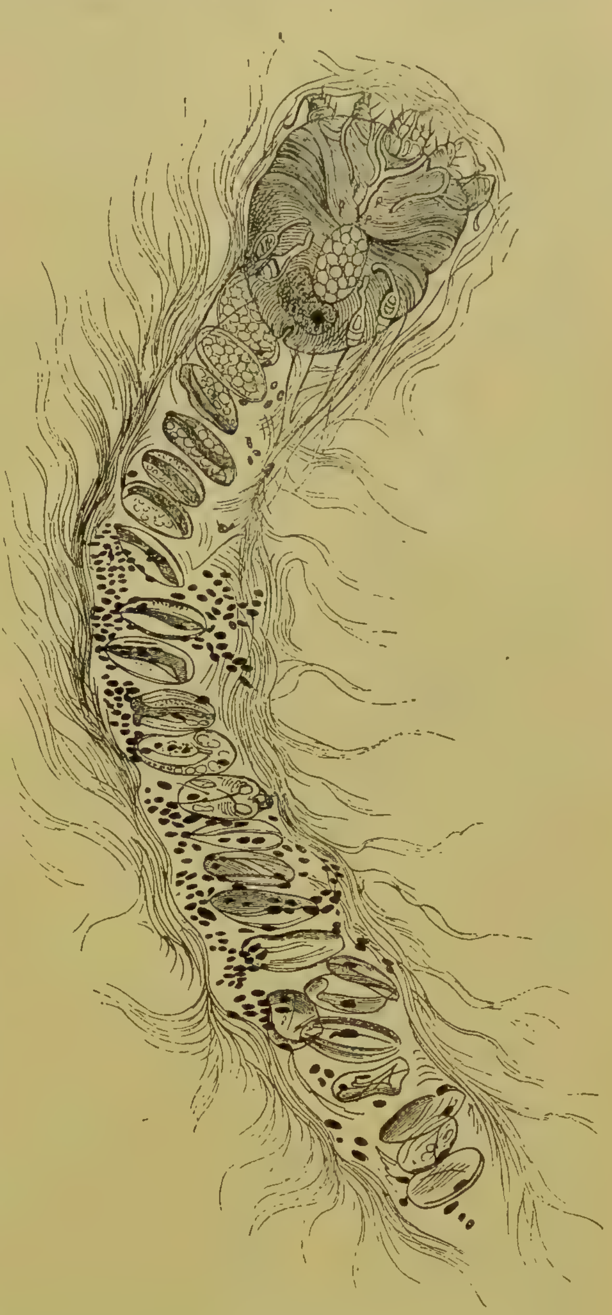

Fig. 100.—Acarian burrow. The female acarus is visible at the terminal extremity of the burrow with ventral surface exposed, and containing a mature ovum. Other ova and shells are seen along the tract; the fæces are represented by black points. (Kaposi.)

Itching is a very constant symptom, and usually rather severe, though varying in degree in different persons. It is most intense at night, especially when the patient gets warm in bed. That warmth is relished by the mite is proved by the fact that it remains quite motionless when it is placed upon a perfectly cold glass slide, but immediately begins to move if it is warmed. The itching is by no means confined to the parts where the acarus resides, but diffused over other parts of the body. To relieve this annoying sensation, the patient scratches the skin wherever it can be reached conveniently with the finger nails. A "pruriginoid eruption" is the result. This consists in scratch marks, excoriations, and irregular patches of papular, pustular, or vesicular eczema.

In severe cases, especially in children, large pustules appear on the hands, feet, and hips. In exceptional cases furunculi, or cellulitis, has been observed. In women, suppurative mastitis may attack those whose mammillary region is severely affected. In persons who do not scratch, either from apathy or from pathological changes of the ends of the sensitive nerves of the skin (anæsthesia), the crusts accumulate to an excessive degree. This form of scabies was first described by Danielssen and Boeck, who saw it in patients suffering from leprosy. It is called *scabies crustosa* or *norwegica*. The thick crusts abound with male and female mites.

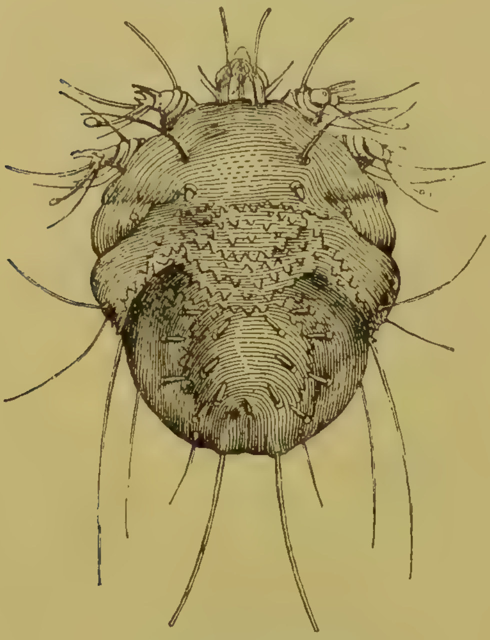

Fig. 101.—Female acarus. (Mégnin.)

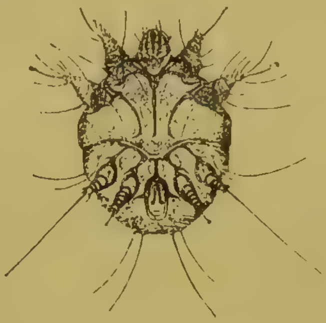

Fig. 102.—Male acarus. (Küchenmeister.)

Etiology.—Scabies is always propagated by the deposition upon the skin by an impregnated female of an egg or a larva. This may take place from man to man, or from animals to men (dogs, rabbits, cats, horses, camels, etc.). Simple contact is not sufficient; it requires an intimate and prolonged contact—as, for instance, occupying the same bed or carrying infants. I do not believe that scabies can be communicated by shaking hands with or sitting next to an infected person. It is doubtful if the disease can be propagated by tools, gloves, clothes, etc., since the mite can live on these articles for a very short time only. No age, sex, or condition is exempt from it, dirty people being, of course, more liable to it. According to Greenough, it is most prevalent between the ages of five and thirty, and comparatively rare after the fiftieth year.

Anatomy.—The following description of the animal is taken from H. R. Crocker's excellent book on Diseases of the Skin: The female is just visible to the naked eye as a minute, white, shining, roundish body, one sixtieth to one eightieth of an inch long (·3022 to ·4322 millimetres), and about two thirds of its long diameter in width. Attached to its conical, stumpy legs are four suckers anteriorly and four setæ or bristles posteriorly, one to each limb; on the back are numerous transverse striæ and serrated lines, with a few short, nail-like setæ; while on the under surface are the legs and a few setæ, and sometimes an ovum is to be seen (Fig. 2). The male is about two thirds the size of the female, has a small sucker on each of the inner posterior pair of legs, for the purpose of copulation, and a well-marked genital organ, consisting of a chitinous framework in the shape of a horseshoe, which supports the penis (Fig. 3). The larva has at first only six legs, and it is not until after its second, or, as some say, its third moult that it is fully developed and has its full complement of eight legs; it, too, burrows a short distance while it is undergoing its molts.

The male acarus has very little clinical significance. It is found in shallow excavations of the skin. The time for the larva to develop from the eggs is only about four to seven days, while the development of the adult acarus from the larva takes about a fortnight.

Diagnosis.—The diagnosis is, as a rule, easy. An eruption of the character and localization as described above should at once arouse suspicion. Search should be made for burrows between the fingers, about the wrists, on the nipple, and on the penis. If the question, Does this eruption itch? is answered in the affirmative, it should be followed by a second question, When does this eruption itch? The patient will answer, Mostly at night. One should not forget to inquire after the patient's occupation. If he happens to work at night and sleep during the day, as is the case with bakers, night clerks, etc., he will tell us, of course, that the eruption bothers him mostly during the day.

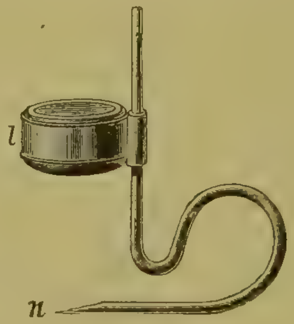

Fig. 103.

To find the burrow, or even the acarus itself, is not so easy as is generally claimed. The rough and dirty edges of minute epidermal scabs may easily be taken for cuniculi. When rubbed with a moist towel these dark lines disappear, which is not the case with the cuniculi. Bergh has constructed a little instrument to facilitate the catching of the mite in the burrow. It consists of a magnifying glass, *l*, to which is attached a flat needle, *n* (Fig. 103). There is generally a history of contagion, such as having recently slept in a bed with some one who had an itchy eruption, and usually more than one member of the household are found to be similarly affected, particularly those sleeping in the same bed with the patient.

Eczema.—The eruption does not show the localization so characteristic for scabies. The vesicles or papules are grouped densely together, forming patches. The multiform character of the eruption of scabies is absent. Itching is confined mostly to the diseased spot, and is not so severe.

Pediculi.—In pediculosis capitis an eruption is chiefly found on the head and about the neck. The eruption caused by pediculi vestimentorum, or body lice, is found in those places where the folds of the clothes touch the skin—for instance, on the back.

Prurigo.—The prurigo papules are densely and numerously located on the extensor surfaces of the lower and upper extremities. The skin covering the flexures of the joints is rarely involved. Vesicles, pustules, or bullæ are absent. Prurigo commences in early childhood, generally with an attack of urticaria. There is no history of contagion.

Complicated Scabies.—It has to be borne in mind that various other eruptions may coexist with scabies. Syphilodermata and scabies, or scabies in children with congenital syphilis, is not of rare occurrence. Purpura and impetigo contagiosa may be associated with scabies. The combination of scabies with leprosy has been mentioned above.

A solitary indurated lesion, caused by the presence of the acarus on the mammilla or penis, may be confounded with a hard chancre. In one such case, occurring in my practice, there was even an indolent swelling of the inguinal glands of one side, and only the consequent development of characteristic symptoms of scabies dispelled all doubts.

Treatment.—The best remedies for the cure of scabies are those which destroy the parasite, its larvæ and eggs, without irritating the skin, and at the same time cause an involution of the secondary or "pruriginous" eruption. It is much better to "hasten slowly" than to try to kill the parasite at once and at any cost.

The so-called "rapid cure," as devised by the French (Hardy), is of value only when we have to deal with a large epidemic in a public institution, for instance, or when a great number of patients apply for treatment at a hospital, which is the case at the Hôpital St. Louis, in Paris. The method of treatment at this hospital is as follows: The patients are first thoroughly scrubbed with green soap and water for twenty minutes; they are then given a bath of an hour's duration. An antiparasitic ointment is now rubbed in all over the body, with special attention to all affected or suspicious places. The patients finally dress without wiping off the ointment. The results show that the majority of cases thus treated are cured. Patients with a very delicate skin or of extensive eruptions are, of course, not suited for this cure. In contrast with this heroic treatment may be considered that which is slower but surer, and best adapted for cases occurring in private practice. The patient is given an antiparasitic ointment, and told to rub in about an ounce of it at night, no bath being taken previously. Rub the salve in well with the hands, beginning with the hands, the interdigital folds, the flexor aspects of the wrists; then going up to the elbows, the axillary folds, the nipples, the navel, hips, the buttocks, the penis, the knees, and finally the insteps of the feet. Avoid the hairy parts. The ointment should be applied twice a day for three or four days in succession, bathing being omitted during its use. At the end of this period a bath should be taken, and the body and bed linen changed, in order to avoid reinfection. If, after three or four days, the itching again increases, the treatment should be repeated in the same manner as before (M. Hartzell).

The strength of the antiparasitic ointment prescribed should vary with the case at hand. The age of the patient, whether an infant, child or adult, the natural sensitiveness of the skin, the duration of the affection, and the amount of secondary disturbance, are important points which have to be carefully considered. An excellent remedy, which is colorless and without odor, is Kaposi's ointment:

℞	β-Naphthol	gr. xl	
	Saponis viridis	ʒ ijss.	
	Cretæ præparat.	ʒ ss.	
	Adipis	℥ ss.	M.

If the skin is very much inflamed, the green soap may be left out, and vaseline or simple ointment substituted. Another very effective remedy is Hebra's modification of Wilkinson's ointment:

℞	Sulphuris sublimat.,			
	Olei cadini	āā	ʒ ij	
	Cretæ præp.		ʒ ijss.	
	Saponis viridis,			
	Adipis	āā	℥ j	M.

In chronic cases, and in the hospital, this ointment is of great value. It stops quickly all the itching caused by the presence of the acarus and the secondary eruption.

The addition of creta preparata to both ointments mentioned above is not arbitrary, as it might seem. It influences the consistency of the ointments, making them thicker, and thus compelling the patient to rub them in more thoroughly and vigorously. I must warn against rubbing the salve in by aid of a piece of flannel, because too much irritation is set up. In France, Helmrich's ointment is used a great deal, the formula for which is:

℞	Sulphuris sublimat.	ʒ j	
	Potass. carbonat.	ʒ ss.	
	Adipis	ʒ vjss.	M.

Not so strong, but cleaner and very pleasant, is Bourguignon's salve. The original prescription of this salve contains not less than five different essential oils for flavoring purposes. Hebra simplified this ointment as follows:

Olei lavand.,		
Olei caryophyl.	āā gtt. v	
Potass. carb.	ʒ ij	
Lactis sulphur.	ʒ v	
Axung. porci, q. s. ut f. unguent.		M.

Before using this salve the patient takes a bath, washing himself thoroughly with plenty of green soap. Balsam of Peru and liquid styrax are good remedies for the cure of scabies in children or persons with a delicate skin:

℞	Styrac. liquid.	℥ jss.	
	Ol. olivar.	℥ ss.	
	Balsam Peruvian.	ʒ j	M.

℞	Styrac. liquid.,		
	Flor. sulphur.,		
	Cretæ alb.	āā ʒ ij	
	Sapon. virid.,		
	Axung. porci	āā ʒ iv	
	M.	(Weinberg's salve.)	

Some of the remedies mentioned above, especially styrax and naphthol, may give rise to an acute nephritis if used too freely. The urine of patients who are using these remedies should be watched. A resinous substance, which is precipitated by boiling, and nitric acid, is sometimes found in the urine of patients treated with preparations of styrax. This sediment must not be confounded with albumen; it is soluble in alcohol and ether. Naphthalinum is not equal to naphthol.

Oxynaphthoic acid was introduced by Schwimmer, who gives the following formula:

℞	Acidi oxynaphthoici,		
	Pulv. cretæ,		
	Saponis viridis	āā ℈ iv	
	Adipis	ad ℥ j	M.

This salve is not irritating, and can be used upon children with advantage.

Another remedy recommended recently is thioresorcin in the strength of fifty to one hundred grains to the ounce. Losophan, a new dermic antimycotic, may also be mentioned.

To prevent reinfection it is advisable to disinfect the clothing, if the patient should not be able to lay it aside for a fortnight. Hot air (at a temperature of 150° Fahr.) or boiling water of course destroys the acarus, its eggs and larvæ. In Vienna no attempt is made to disinfect the clothing, and yet a relapse only occurs once in a hundred cases. At the Glasgow Hospital each patient affected with scabies is told that not only he but all others sleeping with him are to be treated simultaneously.

DEMODEX FOLLICULORUM. (Frederick J. Leviseur.)

Synonyms: Acarus Folliculorum; Simonea Folliculorum, etc.

This parasite measures from $\frac{1}{12}'''$ to $\frac{1}{6}'''$ in length. It has an elongated, rounded, wormlike form, with head, thorax, and abdomen easily distinguishable. Four pairs of short legs branch off from the thorax. It is found in the sebaceous glands and hair-follicles, either single or in numbers (from fifteen to twenty), and may be obtained by scraping the forehead or nose with a spatula and examining in glycerin, with a power of two hundred diameters (Fig. 104).

The presence of this parasite does not give rise to pathological changes of the sebaceous glands, hair-follicles, or the surrounding skin. Even slight eruptions of acne can in no way be traced to the demodex as an etiological factor. It is far otherwise in animals. The demodex of the dog produces a violent inflammation of the sebaceous glands and hair-follicles. Veterinary surgeons affirm that this disease is very hard to cure, and often ends fatally. Fortunately, the demodex caninus is not transmitted to men. The same may be said of the demodex of the lamb, the pig, the cat, the fox, the horse, and the ox.

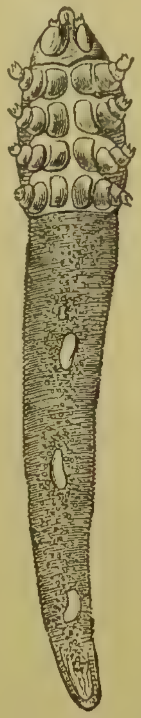

Fig. 104.—Acarus folliculorum. (Küchenmeister.)

PEDICULOSIS. (Frederick J. Leviseur.)

Synonym: Phthiriasis.

1. PEDICULUS CAPITIS.

This epizoic insect belongs to the *anoplura*, which, according to modern ideas, are degraded members of the order *Hemiptera*.

Symptoms.—This louse lives exclusively on the scalp and capillitium. Irregular patches of moist eczema, pustules, crusts, excoriations, furunculi, even abscesses, are formed on the scalp, the occipital region being most frequently affected. Pronounced swelling of the glands of the neck is usually present in cases of long standing. The superficial lymph glands may suppurate. Erythema and eczema of the neck and forehead and blepharitis and conjunctivitis appear quite often.

There is severe itching, and the patients rub and tear the scalp with their nails. The unclean, poorly nourished, or strumous patients present the most pronounced lesions. In extreme cases a condition comes about which is called *plica polonica*. The hairs are matted together from pus, serum, dirt, scabs, scales, living and dead lice, their eggs and *débris*—so much so that this disgusting mass impresses one as an excrescence of the scalp.

Diagnosis.—Though the louse itself is easily detected, its eggs are of more diagnostic value. These eggs, or "nits," have a peculiar whitish, glistening appearance. The female louse very cleverly glues her eggs on the hair-shaft. They are situated unilaterally, and adhere very firmly to the hair. Pediculosis capitis is most apt to be mistaken for an eczema of the scalp, but a close examination will at once reveal the true nature of the disease.

Attempts have been made to prove that the head louse is liable to slight variation in color, according to the race of men infested (mimicry). There is yet need for further investigation. That lice are considered *bonnes bouches* by certain uncivilized tribes is well known.

Treatment.—Kerosene oil is the most reliable remedy to kill the parasite and its eggs. It may be used pure, or with the addition of olive oil or balsam of Peru. The scalp is soaked freely with the oil and then covered with a bathing cap or something similar. After twelve to twenty-four hours the scalp is thoroughly washed with warm water and soap. Careless patients must be warned in regard to the danger of setting the kerosene oil on fire.

To remove the empty and dead nits a solution of acetic acid or simple vinegar may be used. After the lice have been killed it will be an easy matter to cure the eczema which may have remained. It need hardly be mentioned that carbolic acid, bichloride of mercury, sulphur, oil of cade, β-naphthol, and other antiparasitic remedies may be used to advantage. G. T. Jackson says that it is always preferable to use lotions rather than ointments in treating pediculosis capitis.

By cutting the hair short the field is cleared for therapeutical action. This radical measure is, however, by no means always necessary. Shampooing the scalp occasionally and observing the general rules of cleanliness are sufficient to prevent a recurrence.

2. PEDICULUS VESTIMENTI.

Synonyms: Pediculosis Corporis; Phthiriasis.

This insect is much larger than the pediculus capitis. It lives in the clothes and not on the skin, which it attacks only when in search of food.

It is easily found in the shirts or underwear, where it tries to hide itself in the folds, generally around the waist and neck. After biting through the epidermis it inserts its sucking apparatus, consisting of a membranous tube, and draws blood from the papillæ. Some authors believe that the insect does not bite at all, but only sucks, using a sweat-pore as a *locus minoris resistentiæ.* However this may be, intense itching follows at once these attacks made on the skin. The patient scratches, producing deep, long excoriations. Three or four tracks, running in almost parallel directions, may often be seen as the result of the finger nails plowing through the epidermis. These excoriations leave, upon healing, brown spots or streaks of pigmentation.

In severe cases the skin is of a more uniformly dark color, almost resembling the skin of a mulatto (*melanodermie phthiriasique* of the French). In mild cases the symptoms are somewhat localized to the space between the scapulæ, to the waist, and buttocks. A case of leucoderma in a white man complicated with pediculi vestimenti came under my observation at the Randall's Island hospitals. There was, of course, no pigmentation on the excoriated leucoderma-spots, but the normal skin wherever affected was of a chocolate-brown color.

Pediculi vestimenti are generally found on poor and very much neglected persons, tramps, beggars, etc. Occasionally they may find their way to clean people, but the free use of soap and water, and the frequent changing of underclothing, prevent them from staying any length of time.

Diagnosis.—This is rarely attended with difficulty. It has to be borne in mind that the parasite is found in the clothes, and only very rarely on the skin itself. By letting the patient strip slowly and examining the folds of the underclothing the louse will readily be detected. The excoriations and pigmentation, with their peculiar configuration and localization, will enable one often to make the correct diagnosis even in the absence of the louse. The social position of the patient should not prejudice the physician in any way.

Treatment.—It is sufficient to prescribe a bath, and insist on a thorough change of underwear. It is safest to throw away the old and use new garments. This is of course expensive, and in hospital and dispensary practice the old linen and underwear have to be steamed or boiled for some time. A temperature of 160° to 180° kills the louse and its eggs. The application of a salve, consisting of 5 parts of carbolic acid to 100 parts of white vaseline, is very beneficial, on account of its antipruritic and antiparasitic qualities.

3. PEDICULUS PUBIS.

The crab-louse (French, *morpion;* German, *Filzlaus*) lives on all hairy parts of the body except the scalp. It commonly attacks the pubic region, grasping the hairs where they emerge from the skin and burrowing its head into the follicle. It is quite difficult to extricate the insect, which is often overlooked on account of its pale yellow color (mimicry). The nits resemble those of the head louse, and are attached to the hairs in exactly the same manner. The louse is found not infrequently on the eyelashes of unclean children and adults. Dr. Schapringer, who has seen many such cases in the eye department of several dispensaries, says that the crab-louse avoids inflamed eyelids, and that he never found it on an eye affected with blepharitis.

The louse produces intense itching and eczema, usually of the small papular variety. In persons who do not scratch much, for instance, on account of an intervening disease or from general apathy, the so-called *maculæ cæruleæ* (*tâches bleues*, *tâches ombrées* or *ardoisées*) are formed. These bluish spots have the size of a lentil to a finger nail. Some have a round, others an irregular, oval shape. Gyrate figures can be seen on some places as a consequence of the confluence of densely grouped individual spots. The eruption is usually localized on the inner surface of both thighs and the anterior part of the abdomen. The color of the spots is bluish with a tendency toward sepia brown. Duguet, in 1880, succeeded in producing maculæ cæruleæ by pricking the skin with a lancet-point charged with a paste made by rubbing up the bodies of twenty-five lice. According to Mallet, the *materia peccans* comes from the two pairs of salivary glands contained in the thorax of the crab-louse opposite the anterior pair of legs. I believe that the spot is a hyperæmia caused by the subepidermal introduction of an irritating matter.

Diagnosis.—If sufficient care be taken, the pediculi may always be found. Violent itching, without marked eruption, often suggests the possibility of their presence.

Treatment.—Blue ointment and white precipitate ointment are well-known and excellent remedies. It is not advisable to cut off or shave the hair.

Tincture of cocculus Indicus, corrosive sublimate solution, naphthol ointment, infusion of tobacco, etc., will also answer the purpose. Care should be taken not to produce a dermatitis. The application of calamine lotion or a soothing ointment after the insects and their ova are killed is to be recommended.

FILARIA MEDINENSIS. (Frederick J. Leviseur.)

Synonyms: Dracunculus Medinensis; s. Filaria Medinensis; Guinea-Worm.

This worm is from one and a half to three or four feet in length, milk-white in color, cylindrical but somewhat flattened laterally, tapering toward the extremities, and from one tenth to one fifteenth of an inch thick. It is covered with a thick but elastic cuticula. Only the female of the worm is known. It is found within the tropics, its most frequent habitats being Senegal, Gaboon, the Gold Coast, Guinea, Grenada, the island of Curaçoa, Upper Egypt, Nubia, Arabia Petræa, Persia, and the East Indies.

It is not yet known how the worm enters the epidermis. In Africa, Persia, India, and Curaçoa the belief is current that it enters into the human body in an embryonic stage by way of the intestinal tract. In Kordofan and Sennaar, on the other hand, it is believed that the worm bores directly into the exposed skin. The first supposition, however, seems to be the correct one.

Symptoms.—When at full maturity the worm may be felt like a piece of thin whipcord. If it has attacked parts of the body which are not fleshy, as the fingers, the joints, etc., it produces intense pain. In the soft parts, as the muscles, etc., it gives rise to a sensation of fullness and tension, which may last for many days, or even weeks. Considerable systemic and local irritation is excited, a small boil is formed, the skin breaks, and the head of the worm protrudes. In a synopsis of one hundred and eighty-one cases the worm was found on the feet; one hundred and twenty-four times, on the lower part of the thigh; thirty-three times, upper part; eleven times, hands; and scrotum, twice. From three to twelve worms may be found to affect one individual.

Diagnosis.—The diagnosis can only be made with positiveness when the head of the worm appears on the surface.

Treatment.—The treatment consists in a careful extraction of the worm. The head is secured, fastened to a small piece of stick or to a quill, and the worm is wound out by gentle traction. Three days to several weeks may elapse before it is completely extracted. The natives of India also extract the worm by suction, with or without previous incision. Electrolysis has been recently recommended in the treatment of Guinea-worm (James Christie, in Anderson's Text-Book on Diseases of the Skin).

PULEX IRRITANS.

The common flea produces wheals which soon disappear and leave small hæmorrhagic spots surrounded by a narrow hyperæmic halo. The lesion bears a slight resemblance to purpura. The general dirtiness of the patient and the configuration of the more recent bites remove any doubt as regards the diagnosis.

PULEX PENETRANS.

This insect is well known as a burrower into the naked feet of men in sandy localities in the West Indies and South America. Military expeditions in South America and the French army in Mexico suffered a great deal from this pest. The flea usually enters under the nail, causing inflammation and ulceration. If it is not picked out in time, extensive suppuration or even gangrene may follow. Anointing the foot with turpentine or carbolized oil prevents further attacks.

CIMEX LECTULARIUS.

The common bedbug bites the skin and empties the contents of its large salivary gland into the minute wound. Itching is very intense, and wheals resembling those of urticaria appear at once. The eruption and the itching usually disappear during the day. As a rule, the insect itself can easily be caught either in the bedclothing or in the crevices of the bedstead, or in recesses behind the wall paper and wainscoting. The differential diagnosis between the eruption caused by bedbugs and urticaria may sometimes be rendered difficult. I believe it quite possible that an urticaria may be caused by repeated attacks, and continue long after the insect has been exterminated.

CULEX PIPIENS

And similar insects give rise to wheals and severe itching, mostly on those parts of the body which are not protected by the clothes. A concentrated solution of ammonia applied as soon as the irritation is felt alleviates the unpleasant sensation.

IXODES RICINUS.

The female buries its head into the skin, and, sucking the blood, produces a wheal. If caught in the act, it appears as a little sac of the size of a large pea. Care should be taken not to remove it forcibly, for fear of its leaving its proboscis in the wound. After it has digested its meal it falls off by itself.

LEPTUS AUTUMNALIS

Is considered to be the larva of trombidium. This mite lives on bushes and on the grass, and occasionally attacks people working in field and garden. It produces a slight eruption of wheals and papules, which readily disappear on the application of a simple cooling or antipruritic ointment or lotion.

DERMANYSSUS AVIUM.

This mite is of the size of a mustard seed; it lives on birds, and is often found in hen-houses and bird cages. Occasionally it attacks men, producing an itching eruption of papular character.

CYSTICERCUS CELLULOSÆ CUTIS

Is sometimes found in the subcutaneous tissue, where it forms tumors of the size of a pea. The skin covering these tumors shows no change, and is freely movable. If punctured, clear fluid containing the characteristic hooklets will escape. The etiology of these tumors is the introduction into the stomach of the eggs of tænia solium. This affection is of little dermatological interest; it furnishes, however, valuable aid in the diagnosis of cysticercus in internal organs, as the brain, the eye, etc.

Echinococcus hydatid has also been reported as being found in the skin.

APPENDIX.

The table of statistics herewith appended, embracing over two hundred thousand cases of skin disease, which has been compiled from the record of the returns to the Committee on Statistics of the American Dermatological Association, can not fail to prove of great interest and value. Of these statistics, extending over a period of fifteen years, it may be said that they by no means represent the entire number of cases of skin disease coming under the observation of the members of this association during that period. The completeness of the returns has varied from year to year, according to the more or less active interest of the different members in the work of tabulation. Although incomplete from a numerical standpoint, they are none the less valuable in furnishing a correct indication of the relative frequency of the various forms of skin disease occurring in this country and affording a basis of comparison with similar statistics in other countries. It would be interesting to institute such a comparison with Crocker's analysis of twelve thousand cases tabulated in the last volume of his work on Diseases of the Skin, or with the statistics of Continental observers, showing the etiological influences of climate, habits, and modes of living upon the development of skin diseases. In general terms it may be said that certain dermatoses of animal or vegetable parasitic origin—diseases associated with poverty, personal uncleanliness, and intimate contact—are much more prevalent in Europe than in this country; also that lupus vulgaris and other forms of cutaneous tuberculosis, rhinoscleroma, prurigo, and various other cutaneous affections of common occurrence on the Continent, are comparatively infrequent in the United States. On the other hand, many cutaneous disorders connected with the glandular and nervous systems are much more prevalent and exhibit a severer type in this country.

While these statistics are most valuable for the purposes indicated, it can not be claimed that the percentages given establish the absolute frequency of any particular disease, and they must therefore be accepted with certain qualifications. Thus, for example, the *statistical* frequency of diseases which, like psoriasis and eczema, are essentially chronic, rebellious to treatment, with tendency to repeated recurrences, is larger than the *actual* frequency, since cases of this character are apt to drift from one specialist to another, and often figure more than once in the list. On the other hand, certain diseases, of which acne and seborrhœa may be taken as the types, are undoubtedly of much commoner occurrence than would be indicated by the percentages given in the table, since many of these cases are treated by the family physician instead of the specialist. Again, many patients with lupus, epithelioma, sarcoma, or other new growths often apply to the general surgeon for treatment, and consequently the percentage given of this class of cases is much below the actual frequency. The figures indicating the relative frequency of the exanthemata, scarlatina, measles, and variola, must also be received with qualification, since such cases naturally fall under the care of the general practitioner, and those recorded in this list are most probably ambulant cases which come to the specialist for diagnosis.

But these and other possible sources of error which might be pointed out by no means invalidate these statistics as a basis of comparison, since the same qualifying conditions apply to the statistics of skin diseases collected by dermatologists of other countries.

In studying this table, it will be observed that the nomenclature which was adopted by the American Dermatological Association in 1891 differs in some respects from that employed by the editor of this work. This disagreement has been in most instances harmonized by the insertion in parentheses of the synonymous terms employed in this work. Further, it will be seen that the names of a large number of diseases described in this volume do not appear in these statistics. This is due partly to the fact that many dermatoses formerly grouped together have been recognized as distinct clinical entities since the date of adoption of this nomenclature, and partly to the circumstance that many diseases peculiar to tropical climates, and of rare or only accidental occurrence in this country, have been treated of in the present work. Among the more important of these additions may be mentioned Erythema Induratum, Erysipeloid, Acrodynia, Dermatitis Repens, Dermatitis Seborrhoica, Epidemic Exfoliative Dermatitis, Dermatitis Exfoliativa Neonatorum, Prurigo, Parakeratosis Variegata, the various forms of Sphaceloderma, Anomalous Discoloration of the Skin, Acanthosis Nigricans, Keratoangioma, Papilloma Cutis, Œdema Neonatorum, Acromegaly, Ainhum, Xanthoma Diabeticorum, Angioma Serpiginosum, Morvan's Disease (Syringomyelia), Colloid Degeneration of the Skin, Adenoma Sebaceum, Adenoma of the Sweat Glands, Multiple Benign Cystic Epithelioma, Lymphangioma Tuberosum Multiplex, Multiple Benign Tumorlike New Growths of the Skin, Psorospermosis, Verruga Peruana, Oriental Boil, Tropical Phagedenic Ulcer, Hematidrosis, Hidradenitis Suppurativa, Chronic Miliaria, Hidrocystoma, various affections of the Hair-follicles, Folliculitis Decalvans, Conglomerate Suppurative Perifolliculitis, Tinea Imbricata, Fungous Foot of India, Mal del Pinto, and a number of other diseases due to animal and vegetable parasites.

Phlegmona Diffusa has been excluded from consideration in this work as more properly falling within the province of the general surgeon. The figures indicating the percentage of Syphiloderma are of interest, as showing the proportion of such cases coming under the observation of the specialist in skin diseases.

Combined Returns of the American Dermatological Association, from June 30, 1878, to January 1, 1893. (Compiled by W. F. Robinson, M. D.)

	Number of cases.	Per cent of cases.
Acne	16,559	8·08
Actinomycosis	......	......
Albinismus	13	0·006
Alopecia	1,839	0·898
Alopecia areata	1,539	0·751
Alopecia furfuracea	1,563	0·763
Anæsthesia	26	0·012
Angioma	788	0·384
Angioma cavernosum	31	0·015
Anidrosis	25	0·011
Anthrax simplex (carbuncle)	369	0·175
Anthrax maligna (malignant pustule)	179	0·087
Asteatosis	16	0·007
Atrophia maculosa	39	0·018
Atrophia pilorum propria	27	0·012
Atrophia senilis	26	0·012
Atrophia striata	39	0·018
Atrophia unguis	93	0·046
Bromidrosis	185	0·090
Callositas	256	0·120
Canities	95	0·047
Carcinoma	1.623	0·791
Chloasma	929	0·452
Chromidrosis	14	0·006
Cicatrix	143	0·069
Clavus	409	0·200
Comedo	1,913	0·933
Cornu cutaneum	58	0·028
Dermatalgia	13	0·006
Dermatitis calorica	489	0·239
Dermatitis exfoliativa	97	0·048
Dermatitis gangrænosa	78	0·036

	Number of cases.	Per cent of cases.
Dermatitis herpetiformis	186	0·090
Dermatitis medicamentosa	463	0·225
Dermatitis papillaris capillitii	1	0·0004
Dermatitis traumatica	1,080	0·527
Dermatitis venenata	1,517	0·740
Ecthyma	1,131	0·552
Eczema	60,940	29·746
a, Erythematosum.		
b, Papulosum.		
c, Vesiculosum.		
d, Madidans.		
e, Pustulosum.		
f, Rubrum.		
g, Squamosum.		
Elephantiasis	89	0·043
Epithelioma	365	0·178
Equinia	1	0·0004
Erysipelas	1,827	0·891
Erythema multiforme	1,387	0·677
Erythema nodosum	247	0·120
Erythema simplex	1,737	0·843
Erythrasma	5	0·0024
Fibroma	184	0·090
Frambœsia	24	0·011
Furunculus	3,454	1·686
Granuloma fungoides (mycosis fungoides)	4	0·0018
Herpes simplex	3,119	1·686
Herpes zoster	2,415	1·174
Hyperæsthesia	47	0·023
Hyperidrosis	653	0·318

	Number of cases.	Per cent of cases.
Hypertrichosis	1,093	0·533
Ichthyosis	466	0·227
Ichthyosis congenita	3	0·0014
Impetigo	2,480	1·161
Impetigo contagiosa	2,106	1·028
Impetigo herpetiformis	18	0·009
Keloid	257	0·121
Keratosis follicularis	24	0·011
Keratosis pilaris	323	0·158
Keratosis senilis	225	0·105
Lentigo	299	0·146
Lepra	56	0·022
Leucoderma	192	0·093
Lichen planus	599	0·204
Lichen ruber	52	0·026
Lipoma	43	0·021
Lupus erythematosus	868	0·423
Lupus vulgaris	855	0·417
Lymphangioma	44	0·0214
Melanoderma lenticularis progressiva (xeroderma pigmentosum)	7	0·0034
Miliaria rubra	52	0·0253
Milium	413	0·231
Molluscum epitheliale (molluscum contagiosum)	332	0·162
Morbilli	92	0·045
Morphœa	78	0·0031
Myoma	2	0·0009
Myxœdema	3	0·0014
Nævus fibrosus	13	0·006
Nævus pigmentosus	299	0·141
Nævus pilosus	34	0·016
Nævus vascularis	69	0·033
Neuroma	20	0·009
Œdema circumscriptum acutum (angio-neurotic œdema)	31	0·015
Onychauxis	155	0·076
Pachydermatocele (or dermatolysis)	1	0·0004
Pediculosis capillitii	4,236	2·067
Pediculosis corporis	2,837	1·379
Pediculosis pubis	682	0·331
Pellagra	......	......
Pemphigus	291	0·142
Pemphigus neonatorum	3	0·0014
Phlegmona diffusa	378	0·184
Pityriasis maculata et circinata	278	0·135
Pityriasis rubra	66	0·032
Pityriasis rubra pilaris (lichen ruber)	2	0·0009
Pompholix	26	0·012
Pruritus	4,398	2·000
Psoriasis	6,952	3·392
Purpura	484	0·236
a, Simplex	447	0·218
b, Hæmorrhagica	106	0·051
Rhinoscleroma	7	0·0034
Rosacea	1,768	0·863
a, Erythematosa	927	0·452
b, Hypertrophica	93	0·046
Rubeola, German measles	50	0·024
Sarcoma	110	0·053
Scabies	8,306	4·054
Scarlatina	60	0·024
Sclerema neonatorum	1	0·0004
Scleroderma	85	0·041
Scrofuloderma	1,046	0·510
Seborrhœa	3,116	1·521
a, Congestiva	68	0·033
b, Oleosa	805	0·392
c, Sicca	966	0·471
Steatoma	294	0·143
Sudamen	481	0·234
Sycosis vulgaris	803	0·392
Syphiloderma	24,112	11·779
Tinea favosa	727	0·354
Tinea trichophytina	3,429	1·624
a, Circinata	1,505	0·734
b, Tonsurans	1,323	0·641
c, Sycosis	786	0·384
Tinea versicolor	2,324	1,134
Trichorrhexis nodosa	9	0·004
Uridrosis	15	0·007
Urticaria	5,750	2·806
Urticaria pigmentosa	24	0·011
Vaccinia	42	0·0205
Varicella	146	0·071
Variola	21	0·0103
Verruca	2,105	1·027
Vitiligo	382	0·186
Xanthoma	141	0·069
Xerosis	164	0·080
Total	204,866	......

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